8.1 AIR QUALITY

8.1.1 Air Quality Setting

8.1.1.1 Geography and Topography

The Pico Power Project (PPP) site is located approximately 0.06 miles north of the intersection of the Central Expressway and Lafayette Street in Santa Clara, California. The site is located 0.34 miles west of the San Jose Airport property (northern runway portion) approximately 7.2 miles south of the southern shoreline of San Francisco Bay (Santa Clara County). Approximately 5.16 miles northwest of the site lies the Moffett Field Federal Air Field complex. The nearest residential area is approximately 0.39 miles northwest of the proposed project site.

The project site is relatively flat, at an average elevation of 32 feet above sea level and is situated within the Santa Clara-San Jose urban region. To the northwest of the site lies the City of Sunnyvale. To the northeast lies the City of Milpitas. To the east and southeast lies the urban region of San Jose. To the south lies the main urban region of the City of Santa Clara. To the west lie the urban regions of the cities of Los Altos and Mountain View. Figure 8.1-1 shows the terrain within 6 miles of the project. In addition, Figure 8.9-1 shows terrain features for 10 miles around the site as well as terrain above the stack height.

8.1.1.2 Climate and Meteorology

The overall climate in the project area is dominated by the semi-permanent eastern Pacific high pressure system, centered over the northeastern Pacific Ocean. This high is typically centered between the 140 W and 150 W meridians. Its position and size typically governs California's weather. In the summer, the high is strongest and moves to its northernmost position, which results in strong northwesterly air flow and negligible precipitation. A thermal low pressure area from the Sonoran-Mojave Desert also causes air to flow onshore over the San Francisco Bay area much of the summer.

The steady northwesterly flow around the eastern edge of the Pacific high pressure cell exerts a stress on the ocean surface along the west coast. This causes cold water to form at the surface, which cools the air even further. This cooling produces a high incidence of fog and clouds along the northern California coast in summer.

In the winter, the high weakens and moves southwestward toward Hawaii, which allows storms originating in the Gulf of Alaska to reach northern California, bringing wind and rain. About 80 percent of the region's annual rainfall of approximately 14.3 inches occurs between November and March. During the winter rainy periods, inversions are weak or nonexistent, winds are often moderate, and the air pollution potential is very low. During summer and fall, when the Pacific high becomes dominant, inversions become strong and often are surface based; winds are light and the pollution potential is high. These periods are often characterized by winds that flow out of the Central Valley into the Bay Area region.

Historical climatic data for the project area was derived from the following sites located to the south and southeast of the project site.

- Santa Clara University, Station #047912, Period of Record 1/3/31 to 5/31/76, Latitude 37 deg, 21 min : Longitude 121 deg, 56 min
- San Jose, Station #047821, Period of Record 7/1/48 to 12/31/2001 (present), Latitude 37 deg, 21 min : Longitude 121 deg 54 min

A summary of data from these sites indicates the following:

- Maximum average daily temperature 71.1 deg F
- Minimum average daily temperature 48.0 deg F
- Recorded maximum daily temperature 108.5 deg F
- Recorded minimum daily temperature 19 deg F
- Mean annual precipitation 14.56 in.

Detailed climatic summaries for these sites are presented in Appendix 8.1-B.

Air quality is determined primarily by the type and amount of pollutants emitted into the atmosphere, the topography of the air basin, and the meteorological conditions. In the project area, stable atmospheric conditions and light winds can provide conditions for pollutants to accumulate in the air basin. The predominant winds in California are shown in Figures 8.1-2 through 8.1-5 (all of the figures in this section are located at the end of the section). As the figures indicate, winds in California generally are light and easterly in the winter, but strong and westerly in the spring, summer, and fall.

Wind patterns in the area of the project site are presented in Figures 8.1-6a through 8.1-6e, which are the cumulative annual and quarterly wind roses for the San Jose Airport (1992-1995, and 1997) meteorological station. The wind roses indicate that winds are persistent and predominantly from the west through the northwest. Calm conditions occur approximately 0.38% percent of the time. About 47% percent of the winds come from west through north-northwest. In general, the northwesterly winds are associated with a convective flow of cool marine air (i.e., off San Francisco Bay) inland to the warm interior during the warm part of the day and the warm part of the year. However, there is also a significant incidence of southeast through south-southeast wind flow (approximately 26%). These southeasterly winds occur under conditions of relatively cold temperatures inland, i.e., during the cool parts of the year and the cool parts of the day, when temperatures over the Bay are warmer than those inland and cause an offshore convective flow. Figure 8.1-6f shows the cumulative (all met years) stability rose for the San Jose Airport data.

Seasonal wind flow patterns for the Bay Area are shown on Figure 8.1-7. Statistical data for these patterns is summarized in Table 8.1-1.

The mixing heights of the area are affected by the eastern Pacific high pressure system and marine influences. Often the base of an inversion is found at the top of a layer of marine air because the marine environment is cooler nature. Data derived at Oakland, the nearest upper-level meteorological station (located approximately 28 miles north of the project site), indicates that the 50th percentile morning mixing heights for the period 1979-80 were approximately 1770 feet (530-550 meters) in summer and fall, and 3600-3900 feet (1100-1200 meters) in winter and spring. The 50th percentile afternoon mixing heights ranged between 2150 and 3030 feet (660-925 meters) in summer and fall, and over 3900 feet (>1200 meters) in winter and spring. Such mixing heights provide generally favorable conditions for the dispersion of pollutants. Inland areas, where the marine influence is weaker, often experience strong ground-based inversions during cold weather periods. These inversions inhibit dispersion of low-lying sources of air pollution such as cars, trucks, and buses, which can result in high pollutant concentrations.

Figure 8.1-1. Elevation within six miles.

Table 8.1-1. San Francisco Bay Area air basin surface airflow types: seasonal and diurnal percentage of occurrence (1977-1981 Data).

Time - PST	Types							
	Ib North-westerly (Weak)	Ia North-Westerly (Moderate to Strong)	II South-erly	III South-easterly	IV North-easterly	V Bay Inflow	VI Bay Out-Flow	VII Calm
Winter								
4 a.m.	3	4	19	14	8	21	5	24
10 a.m.	4	5	19	20	10	11	19	9
4 p.m.	16	16	16	12	13	3	22	1
10 p.m.	6	9	14	14	10	20	3	21
All times	7	9	17	15	10	14	12	14
Spring								
4 a.m.	27	25	11	2	4	15	5	12
10 a.m.	29	25	14	6	5	3	17	1
4 p.m.	22	60	7	4	4	2	2	*
10 p.m.	40	34	8	2	4	5	3	5
All times	29	36	10	3	4	6	7	5
Summer								
4 a.m.	40	37	4	*	0	6	2	10
10 a.m.	37	44	4	*	1	1	13	0
4 p.m.	20	77	2	0	1	0	*	0
10 p.m.	39	55	2	0	*	1	1	1
All times	34	53	3	0	1	2	4	3
Fall								
4 a.m.	25	13	7	6	3	22	3	19
10 a.m.	28	15	6	11	6	7	23	4
4 p.m.	31	46	5	2	6	2	2	*
10 p.m.	37	24	6	4	3	13	13	12
All times	30	24	6	6	4	11	11	9
Yearly								
4 a.m.	24	20	10	6	4	16	4	16
10 a.m.	25	22	11	9	6	6	18	4
4 p.m.	22	50	8	5	6	2	7	*
10 p.m.	31	30	8	5	4	10	2	10
All times	26	30	9	6	5	8	8	8

Note: * <0.5%

8.1.2 Existing Air Quality and Overview of Standards and Health Effects

The U.S. Environmental Protection Agency (USEPA) has established national ambient air quality standards (NAAQS) for ozone, nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), 10-micron particulate matter (PM_{10}), 2.5-micron particulate matter ($PM_{2.5}$), and airborne lead for the protection of public health and welfare. In general, if these NAAQS are exceeded in an area more than once a year, the area is considered a "nonattainment area" subject to planning and pollution control requirements that are more stringent than normal requirements.

In addition, the California Air Resources Board (CARB) has established standards for ozone, CO, NO_2, SO_2, sulfates, PM_{10}, airborne lead, hydrogen sulfide, and vinyl chloride at levels designed to protect the most sensitive members of the population, particularly children, the elderly, and people who suffer from lung or heart diseases. CARB carries out control program oversight activities, while local air pollution control districts have primary responsibility for air quality planning and enforcement.

Both state and national air quality standards consist of two parts: an allowable concentration of a pollutant and an averaging time over which the concentration is to be measured. Allowable concentrations are based on the results of studies of the effects of the pollutants on human health, crops and vegetation, and, in some cases, damage to paint and other materials. The averaging times are based on whether the damage caused by the pollutant is more likely to occur during exposures to a high concentration for a short time (one hour, for instance), or to a relatively lower average concentration over a longer period (eight hours, 24 hours, or one year). For some pollutants, there is more than one air quality standard, reflecting both its short-term and long-term effects. Table 8.1-2a presents the state and national ambient air quality standards for selected pollutants. Many of the California ambient air quality standards are more stringent than the federal standards and have shorter averaging periods.

Table 8.1-2a. Ambient air quality standards.

Pollutant	Averaging Time	California Standards Concentration	National Standards Concentration
Ozone	1 hour	0.09 ppm	0.12 ppm
	8 hours	-	0.08 ppm (3-year average of annual 4th-highest daily maximum)
Carbon monoxide	8 hours	9.0 ppm	9 ppm
	1 hour	20 ppm	35 ppm
Nitrogen dioxide	Annual Average	-	0.053 ppm
	1 hour	0.25 ppm	-
Sulfur dioxide	Annual Average	-	80 μg/m^3 (0.03 ppm)
	24 hours	0.04 ppm (105 μg/m^3)	365 μg/m^3 (0.14 ppm)
	3 hours	-	1300 μg/m^3 (0.5 ppm)
	1 hour	0.25 ppm	-
Suspended particulate matter (10 micron)	Annual Geometric Mean	30 μg/m^3	-
	24 hours	50 μg/m^3	150 μg/m^3
	Annual Arithmetic Mean	-	50 μg/m^3
Suspended particulate matter (2.5 micron)	Annual Arithmetic Mean	-	15 μg/m^3 (3-year average)
	24 hours	-	65 μg/m^3 (3-year average of 98th percentiles)
Sulfates	24 hours	25 μg/m^3	-
Lead	30 days	1.5 μg/m^3	-
	Calendar Quarter	-	1.5 μg/m^3

ppm = parts per million
μg/m^3 = micrograms per cubic meter

USEPA's new NAAQS for ozone and fine particulate matter went into effect on September 16, 1997. For ozone, the previous one-hour standard of 0.12 ppm was replaced by an eight-hour average standard at a level of 0.08 ppm. Compliance with this standard is based on the three-year average of the annual fourth-

Table 8.1-2b. Santa Clara County historic air quality data summary.

Santa Clara County										
Ozone (ppm)	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
Peak indicator	.130	.117	.117	.119	.115	.125	.126	.125	.127	.126
National 1-hour design value	.120	.120	.120	.120	.118	.130	.129	.129	.118	.125
National 8-hour design value	.088	.082	.078	.080	.080	.086	.088	.085	.085	.080
Maximum 1-hour concentration	.130	.130	.130	.130	.130	.145	.129	.114	.147	.125
Maximum 8-hour concentration	.096	.108	.101	.112	.095	.109	.103	.084	.111	.102
Days above state standard	10	12	15	14	8	22	24	3	22	12
Days above national 1-hour standard	1	1	1	1	1	6	1	0	3	1
Days above national 8-hour standard	4	5	3	4	2	14	8	0	8	4
PM10 (ug/m3)	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
Maximum 24-Hour concentration	173	153	112	101	93	60	76	95	92	114
Maximum annual geometric mean	33	31.5	29.5	24	24.8	21.9	22.1	23.7	22.5	25.4
Days above state 24-hour standard	66	84	78	48	42	24	12	18	18	30
Calculated days above national 24-hour standard	6	0	0	0	0	0	0	0	0	0
Carbon Monoxide (ppm)	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
Peak Indicator	12.6	12.4	11.1	9.3	8.1	7.8	7.4	6.5	6.7	6.5
Maximum 1-Hour Concentration	18	15	11	14	12	8.9	8.8	9.9	8.6	9
Maximum 8-hour concentration	11	11	7.8	6.9	8.8	5.8	7.0	6.1	6.3	6.3
Days above state 8-hour standard	4	4	0	0	0	0	0	0	0	0
Days above national 8-hour standard	2	3	0	0	0	0	0	0	0	0
Nitrogen Dioxide (ppm)	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
Peak indicator	.156	.160	.155	.141	.116	.119	.114	.111	.101	.108
Maximum 1-hour concentration	.150	.140	.100	.120	.107	.116	.108	.118	.083	.128
Maximum annual average	.030	.031	.027	.027	.028	.027	.025	.025	.025	.026
Sulfur Dioxide (ppm)	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
Peak indicator	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Maximum 24-hour concentration	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Sources: California Almanac of Emissions and Air Quality-2001 highest daily maximum eight-hour average concentration measured at each monitor within an area. Table 8.1-2b delineates a historical summary of air quality data for Santa Clara County from 1990-1999.

The NAAQS for particulates were revised in several respects. First, compliance with the current 24-hour PM_{10} standard is now based on the 99th percentile of 24-hour concentrations at each monitor within an area. In addition, two new $PM_{2.5}$ standards were added: a standard of 15 $\mu g/m^3$, based on the three-year average of annual arithmetic means from single or multiple monitors (as available); and a standard of 65 $\mu g/m^3$, based on the three-year average of the 98th percentile of 24-hour average concentrations at each monitor within an area. USEPA is delaying implementation of the new standards for an interim period to allow time to establish $PM_{2.5}$ monitoring networks, designate areas, and develop control strategies. Presently, USEPA has very little data to establish the air quality status of areas with regard to $PM_{2.5}$. Specific monitoring station data used for background is given in Section 8.1.3.

8.1.3 Criteria Pollutants and Air Quality Trends

Existing SLAMS/NAMS ambient air monitoring stations were used to characterize the air quality at the project site. These stations were utilized because of their proximity to the project site and because they record area-wide (neighborhood, regional, and urban scale) ambient conditions rather than the localized impacts of any particular facility. All ambient air quality data presented in this section were taken from CARB, BAAQMD, and EPA publications and data sources. Monitoring station location and pollutant data used to establish background air quality for the project area is as follows:

- Mountain View Station (CARB 4300387), Ozone
  Cuesta Monitoring Site
- San Jose Station (CARB 4300392), Ozone, PM_{10}
  Piedmont (Alum Rock) Monitoring Site
- San Francisco Station (CARB 9000306), SO_2
  Arkansas Street Monitoring Site
- San Jose Station (CARB 4300382), Ozone, CO, NO_2 , PM_{10}
  4th Street Monitoring Site

8.1.3.1 Ozone

Ozone is generated by a complex series of chemical reactions between precursor organic compounds (POC) and oxides of nitrogen (NO_x) in the presence of ultraviolet radiation. Ambient ozone concentrations follow a seasonal pattern: higher in the summer time and lower in the winter-time. At certain times, the general area can provide ideal conditions for the formation of ozone due to the persistent temperature inversions, clear skies, mountain ranges to trap the air mass, and exhaust emissions from motor vehicles and stationary, area, and biogenic sources. Based upon ambient air measurements at stations throughout the area, the San Francisco Bay Area Air Basin is classified as a nonattainment area for ozone for both state and federal air quality standards.

Maximum ozone concentrations at the identified stations usually are recorded during the summer months. Tables 8.1-3a, 8.1-3b, and 8.1-3c show the annual maximum hourly ozone levels recorded at the Mountain View, San Jose 4th Street, and San Jose Piedmont monitoring stations, respectively, during the period 1993-2001, as well as the number of days in which the state and federal standards were exceeded. The data show that, on average, the state ozone air quality standard was exceeded several days each year.

During the last three (3) monitoring years, only one exceedance of the federal standard was recorded at any of the three stations.

Data from these stations over the last 3-4 years indicate that ozone concentrations have been consistently below or at the NAAQS, but above the SAAQS. Only one of the three stations has recorded an exceedance of the NAAQS for ozone in the past three (3) years. Data from the most recent three (3) years of data will be used to establish a background level.

Table 8.1-3a. Ozone levels at the Mountain View monitoring station, 1993-2001 (ppm).

	1993	1994	1995	1996	1997	1998	1999	2000	2001
Highest 1-hour average	.11	.08	.12	.11	.10	.10	.11	ND	ND
Number of days exceeding:									
State standard (0.09 ppm, 1-hour)	2	0	2	3	1	2	7		
Federal standard (0.12 ppm, 1-hour)	0	0	0	0	0	0	0		

Source: BAAQMD, CARB

Table 8.1-3b. Ozone levels at the San Jose 4th Street monitoring station, 1993-2001 (ppm).

	1993	1994	1995	1996	1997	1998	1999	2000	2001
Highest 1-hour average	.11	.11	.13	.11	.07	.15	.11	.07	.095
Number of days exceeding:									
State standard (0.09 ppm, 1-hour)	3	2	14	5	0	4	3	0	1
Federal standard (0.12 ppm, 1-hour)	0	0	1	0	0	1	0	0	0

Source: BAAQMD, CARB

Table 8.1-3c. Ozone levels at the San Jose Piedmont monitoring station, 1993-2001 (ppm).

	1993	1994	1995	1996	1997	1998	1999	2000	2001
Highest 1-hour average	.11	.12	.15	.12	.10	.129	.176	.096	.089
Number of eays exceeding:									
State standard (0.09 ppm, 1-hour)	3	3	15	5	1	5	2	1	0
Federal standard (0.12 ppm, 1-hour)	0	0	3	0	0	1	1	0	0

Source: BAAQMD, CARB

8.1.3.2 Nitrogen Dioxide

Nitrogen oxides are primarily generated from the combustion of fuels. Nitrogen oxides include nitric oxide (NO) and NO_2. Since NO converts to NO_2 in the atmosphere over time and NO_2 is the more toxic of the two, nitrogen dioxide is the listed criteria pollutant. The control of NO_2 is important because of its role in the formation of ozone.

Based upon regional air quality measurements of NO_2, the San Francisco Bay Area Air Basin is in attainment for NO_2 for both state and federal standards.

Table 8.1-4 shows the maximum one-hour NO_2 levels recorded at the San Jose 4th Street monitoring station each year from 1993 through 2001, as well as the annual average level for each of those years. During this period there have been no violations of either the state one-hour standard or the annual NAAQS of 5.3 pphm.

Table 8.1-4. Nitrogen dioxide levels at the San Jose 4th Street monitoring station, 1993-2001 (pphm).

	1993	1994	1995	1996	1997	1998	1999	2000	2001
Highest 1-hour average	12	11	12	11	12	8	13	11	11
Annual average (NAAQS = 5.3 pphm)	2.7	2.5	2.7	2.6	2.5	2.5	2.6	2.5	2.4
Number of days exceeding:									
State standard (0.25 ppm, 1-hour)	0	0	0	0	0	0	0	0	

Source: California Air Resources Board and BAAQMD

8.1.3.3 Carbon Monoxide

Carbon monoxide is a product of inefficient combustion, principally from automobiles and other mobile sources of pollution. In many areas of California, CO emissions from wood-burning stoves and fireplaces can also be measurable contributors. Industrial sources typically contribute less than 10 percent of ambient CO levels. Peak CO levels occur typically during winter months, due to a combination of higher emission rates and calm weather conditions with strong, ground-based inversions. Based upon ambient air quality monitoring, the San Francisco Bay Area Air Basin is classified as being in attainment for CO for state and federal standards.

Table 8.1-5 shows the air quality standards for CO, and the maximum one-hour and eight-hour average levels recorded at the San Jose 4th Street monitoring station during the period 1993-2001.

Table 8.1-5. Carbon monoxide levels at the San Jose 4th Street monitoring station, 1993-2001 (ppm).

	1993	1994	1995	1996	1997	1998	1999	2000	2001
Highest 8-hour average	6.88	8.75	5.84	7.0	6.11	6.27	6.28	7.03	5.1
Highest 1-hour average	14	12	9	9	10	8.6	9.0	8.9	7.6*
Number of days exceeding:									
State standard (9.0 ppm, 8-hr)	0	0	0	0	0	0	0	0	0
State standard (20 ppm, 1-hr)	0	0	0	0	0	0	0	0	0
Federal standard (9 ppm, 8-hr)	0	0	0	0	0	0	0	0	0
Federal standard (35 ppm, 1-hr)	0	0	0	0	0	0	0	0	0

Source: California Air Resources Board and BAAQMD

*Data through Oct 2001

Trends of maximum eight-hour and one-hour average CO as shown in Table 8.1-5 indicate that maximum ambient CO levels at the San Jose 4th Street station have been below the state and federal standards for many years, and continue to decline. This same trend is present for the entire BAAQMD as shown in Table 8.1-2b.

8.1.3.4 Sulfur Dioxide

Sulfur dioxide is produced when any sulfur-containing fuel is burned. It is also emitted by chemical plants that treat or refine sulfur or sulfur-containing chemicals. Natural gas contains negligible sulfur, while fuel oils contain larger amounts. Peak concentrations of SO_2 occur at different times of the year in different parts of California, depending on local fuel characteristics, weather, and topography. The San Francisco Bay Area Air Basin is considered to be in attainment for SO_2 for purposes of state and federal air quality planning.

Table 8.1-6 presents the state air quality standards for SO_2 and the maximum levels recorded in San Francisco (site of the nearest SO_2 monitor) from 1993 through 2001. The average SO_2 levels at San Francisco Arkansas Street monitoring station have been well below the state and federal standards.

Table 8.1-6. Sulfur dioxide levels in San Francisco Arkansas Street, 1993-2001 (ppm).

	1993	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**
Highest 1-hour average	.04	.02	.04	.04	.03	.04	.03	.02	.025
3 Hour Average	-	-	-	.02	.022	.02	.017	.016	.017
24 Hour Average	.011	.008	.007	.008	.009	.005	.007	.008	.008
Annual average	.001	.000	.001	.001	.001	.001	.002	.002	.002
Number of days exceeding:									
State standard (0.25 ppm, 1-hr)	0	0	0	0	0	0	0	0	

Source: California Air Quality Data, Annual Summary, California Air Resources Board

8.1.3.5 Particulate Sulfates

Particulate suspended sulfates are generated from the oxidation of SO_2 in the atmosphere. A natural source of particulate sulfates in coastal areas comes from sea spray, due to the sulfate content in seawater. The San Francisco Bay Area Air Basin is in attainment with the state standard for sulfates. There is no federal standard for sulfates.

Table 8.1-7 shows the California air quality standard for particulate suspended sulfate and the maximum 24-hour average levels recorded in San Jose (Moorpark) from 1993 through 1995 and San Jose (4th Street) from 1996 to 2001. Maximum levels are typically well below the state standard.

Table 8.1-7. Particulate suspended sulfate levels, 1993-2001 ($\mu g/m^3$).

	1993	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**
Highest 24-hour average	8.6	6.8	8.6	6.0	6.3	4.7	4.7	ND	ND
Number of days exceeding:									
State standard (25 $\mu g/m^3$, 24-hour)	0	0	0	0	0	0	0		

Source: California Air Quality Data, Annual Summary, California Air Resources Board

8.1.3.6 Particulates (PM_{10})

Particulates in the air are caused by a combination of wind-blown fugitive dust; particles emitted from combustion sources and manufacturing processes; and organic, sulfate, and nitrate aerosols formed in the air from emitted hydrocarbons, sulfur oxides, and nitrogen oxides. In 1984, CARB adopted standards for

PM_{10} and phased out the total suspended particulate (TSP) standards that had been in effect previously. PM_{10} standards were substituted for TSP standards because PM_{10} corresponds to the size range of particulates that can be inhaled into the lungs and therefore is a better measure to use in assessing potential health effects. In 1987, USEPA also replaced national TSP standards with PM_{10} standards. PM_{10} levels in the San Francisco Bay Area Air Basin are attainment or unclassified with respect to federal standards but nonattainment for state standards.

As discussed previously, the NAAQS for particulates were further revised by USEPA with new standards that went into effect on September 16, 1997; two new $PM_{2.5}$ standards were added at that time.

Table 8.1-8a shows the air quality standards for PM_{10}, maximum levels recorded at the San Jose 4th Street monitoring station for 1993-2001, and geometric and arithmetic annual averages for the same period. Table 8.1-8b presents the same information for the San Jose Piedmont monitoring station (1995 to 1998).

Table 8.1-8a. PM_{10} levels at the San Jose 4th Street monitoring station, 1993-2001 ($\mu g/m^3$).

	1993	1994	1995	1996	1997	1998	1999	2000	2001
Highest 24-hour average	92	93	60	76	78	92	114	76	77
Annual geometric mean (State standard = 30 $\mu g/m^3$)	28.1	26.6	22.0	22.1	23.7	22	25.3	23.8	25
Annual arithmetic mean (Federal standard = 50 $\mu g/m^3$)	33.5	30.9	25.8	24.8	25.9	25	28.7	26.7	28
Number of days exceeding:									
State standard (50 $\mu g/m^3$, 24-hour)	3	7	4	2	3	3	5	7	2
Federal standard (150 $\mu g/m^3$, 24-hour)	0	0	0	0	0	0	0	0	0

Source: California Air Quality Data, Annual Summary, California Air Resources Board

Table 8.1-8b. PM_{10} levels at the San Jose Piedmont monitoring station, 1995-1998 ($\mu g/m^3$).

	1993	1994	1995	1996	1997	1998	1999	2000	2001
Highest 24-hour average	ND	ND	57	59	55	54	ND	ND	ND
Annual geometric mean (State standard = 30 $\mu g/m^3$)			25.6	18.5	19.3	19			
Annual arithmetic mean (Federal standard = 50 $\mu g/m^3$)			28.3	21.3	20.9	20			
Number of days exceeding:									
State standard (50 $\mu g/m^3$, 24-hour)			1	2	1	1			
Federal standard (150 $\mu g/m^3$, 24-hour)			0	0	0	0			

Source: California Air Quality Data, Annual Summary, California Air Resources Board

8.1.3.7 Airborne Lead

Lead in the air results from the combustion of fuels that contain lead. Twenty-five years ago, motor gasoline contained relatively large amounts of lead compounds used as octane-rating improvers, and ambient lead levels were relatively high. Beginning with the 1975 model year, new automobiles began to be equipped with exhaust catalysts, which were poisoned by the exhaust products of leaded gasoline. Thus, unleaded gasoline became the required fuel for an increasing fraction of new vehicles, and the phaseout of leaded gasoline began. As a result, ambient lead levels decreased dramatically. The San Francisco Bay Area Air Basin is considered an attainment area for state and federal airborne lead levels for air quality planning purposes.

Table 8.1-9 lists the state air quality standard for airborne lead and the levels recorded in San Jose 4th Street from 1993 through 2001. Maximum quarterly levels are well below the federal standard.

Table 8.1-9. Airborne lead levels at the San Jose 4th Street monitoring station 1993-2001 (μg/m^3).

	1993	1994	1995	1996	1997	1998	1999	2000	2001
Highest quarterly average	.03	.02	.02	.01	.01	.02	.01	ND	ND
Number of days exceeding:									
State standard (1.5 μg/m^3, monthly)	0	0	0	0	0	0	0		

Source: California Air Quality Data, Annual Summary, California Air Resources Board

Figures 8.1-8, 8.1-9, and 8.1-10 show overall air quality trends in the Bay Area AQMD for ozone, carbon monoxide, and PM_{10} respectively as delineated in the CARB 2001 Almanac of Emissions and Air Quality. Appendix 8.1-B contains other related air quality data summaries for Santa Clara County and the Bay Area AQMD.

8.1.4 Affected Environment

The USEPA has responsibility for enforcing, on a national basis, the requirements of many of the country's environmental and hazardous waste laws. California is under the jurisdiction of USEPA Region IX, which has its offices in San Francisco. Region IX is responsible for the local administration of USEPA programs for California, Arizona, Nevada, Hawaii, and certain Pacific trust territories. USEPA's activities relative to the California air pollution control program focus principally on reviewing California's submittals for the State Implementation Plan (SIP). The SIP is required by the federal Clean Air Act to demonstrate how all areas of the state will meet the national ambient air quality standards within the federally specified deadlines (42 USC §7409, 7411).

The California Air Resources Board was created in 1968 by the Mulford-Carrell Air Resources Act, through the merger of two other state agencies. CARB's primary responsibilities are to develop, adopt, implement, and enforce the state's motor vehicle pollution control program; to administer and coordinate the state's air pollution research program; to adopt and update as necessary the state's ambient air quality standards; to review the operations of the local air pollution control districts; and to review and coordinate preparation of the SIP for achievement of the federal ambient air quality standards (California Health & Safety Code (H&SC) §39500 et seq.).

When the state's air pollution statutes were reorganized in the mid-1960s, local air pollution control districts (APCDs) were required to be established in each county of the state (H&SC §4000 et seq.). There are three different types of districts: county, regional, and unified. In addition, special air quality management districts (AQMDs), with more comprehensive authority over non-vehicular sources as well as transportation and other regional planning responsibilities, have been established by the Legislature for several regions in California, including the San Francisco Bay Area (H&SC §40200 et seq.).

Air pollution control districts and air quality management districts in California have principal responsibility for developing plans for meeting the state and federal ambient air quality standards; for developing control measures for non-vehicular sources of air pollution necessary to achieve and maintain both state and federal air quality standards; for implementing permit programs established for the construction, modification, and operation of sources of air pollution; for enforcing air pollution statutes and regulations governing non-vehicular sources; and for developing employer-based trip reduction programs.

Each level of government has adopted specific regulations that limit emissions from stationary combustion sources, several of which are applicable to this project. The other agencies having permitting or oversight authority for this project are shown in Table 8.1-10. Applicable LORS and compliance with these requirements are discussed in more detail in the following sections. An application for a Determination of Compliance will be filed with the BAAQMD approximately one week after the AFC is filed with the CEC.

Table 8.1-10. Air quality agencies.

Agency	Authority	Contact
USEPA Region IX	Oversight of permit issuance, enforcement	Matt Haber, Chief Permits Officer USEPA Region IX 75 Hawthorne Street San Francisco, CA 94105 (415) 744-1254
Bay Area Air Quality Management District	Permit issuance, enforcement	William deBoisblanc Director of Permit Services Bay Area Air Quality Management District 939 Ellis Street San Francisco, CA 94109 (415) 749-4707
California Air Resources Board	Regulatory oversight	Mike Tollstrup, Chief Project Assessment Branch, CARB 2020 L Street Sacramento, CA. 95814 (916) 322-6026

8.1.4.1 Laws, Ordinances, Regulations, and Standards

Federal

Prevention of Significant Deterioration Program

Authority: Clean Air Act §160-169A, 42 USC §7470-7491; 40 CFR Parts 51 and 52

Requirements: Requires prevention of significant deterioration (PSD) review and facility permitting for construction of new or modified major stationary sources of air pollution. PSD review applies with respect to attainment pollutants for which ambient concentrations are lower than the corresponding national ambient air quality standards (NAAQS). The following federal requirements apply on a pollutant-by-pollutant basis, depending on facility emission rates.

- Emissions must be controlled using Best Available Control Technology (BACT).
- Air quality impacts in combination with other increment-consuming sources must not exceed maximum allowable incremental increases for SO_2, PM_{10}, and NO_x.
- Air quality impacts of all sources in the area plus ambient pollutant background levels cannot exceed NAAQS.
- Pre- and/or post-construction air quality monitoring may be required.
- The air quality impacts on soils, vegetation, and nearby PSD Class I areas (specific national parks and wilderness areas) must be evaluated.

PSD review jurisdiction has been delegated to the Bay Area Air Quality Management District (BAAQMD) for all pollutants and is discussed further below under local LORS and conformance.

Administering Agency: BAAQMD, with USEPA Region IX oversight.

New Source Review

Authority: Clean Air Act §171-193, 42 USC §7501 et seq.; 40 CFR Parts 51 and 52

Requirement: Requires new source review (NSR) facility permitting for construction or modification of specified stationary sources. New source review applies with respect to nonattainment pollutants for which ambient concentration levels are higher than the corresponding NAAQS. The following federal requirements apply on a pollutant-by-pollutant basis, depending on facility emission rates.

- Emissions must be controlled to the lowest achievable emission rate (LAER).
- Sufficient offsetting emissions reductions must be obtained following the requirements in the regulations to continue reasonable further progress toward attainment of applicable NAAQS.
- The owner or operator of the new facility has demonstrated that major stationary sources owned or operated by the same entity in California are in compliance or on schedule for compliance with applicable emissions limitations in this rule.
- The administrator must find that the implementation plan has been adequately implemented.
- An analysis of alternatives must show that the benefits of the proposed source significantly outweigh any environmental and social costs.

New source review jurisdiction has been delegated to the BAAQMD for all pollutants and is discussed further under local LORS and conformance below.

Administering Agency: BAAQMD, with USEPA Region IX oversight.

Acid Rain Program

Authority: Clean Air Act §401 (Title IV), 42 USC §7651

Requirement: Requires the reduction of the adverse effects of acid deposition through reductions in emissions of sulfur dioxide and nitrogen oxides. BAAQMD has received delegation authority to implement Title IV.

Administering Agency: BAAQMD, with USEPA Region IX oversight.

Title V Operating Permits Program

Authority: Clean Air Act §501 (Title V), 42 USC §7661

Requirements: Establishes comprehensive operating permit program for major stationary sources. BAAQMD has received delegation authority for this program (see Federal Register, 12-7-01, Volume 66, page 62504). It should be noted here that EPA published a Notice of Deficiency (NoD) for 34 Clean Air Operating Permits programs in California on May 22, 2002. The NoD was issued based upon California's failure to remedy the agricultural permitting exemption contained in HSC 42310(e). The NoD is a prerequisite for withdrawal of Title V permitting authority for the 34 air districts affected. Presently, the applicant does not believe the NoD will affect the proposed facility. The facility will be required to file for a Title V permit based upon its affected source status under the Title IV and NSPS programs.

Administering Agency: BAAQMD, with USEPA Region IX oversight.

National Standards of Performance for New Stationary Sources

Authority: Clean Air Act §111, 42 USC §7411; 40 CFR Part 60

Requirements: Establishes national standards of performance for new stationary sources. These standards are enforced at the local level with USEPA oversight. Relevant new stationary source performance standards are discussed under local LORS below.

Administering Agency: BAAQMD, with USEPA Region IX oversight.

National Emission Standards for Hazardous Air Pollutants

Authority: Clean Air Act §112, 42 USC §7412

Requirements: Establishes national emission standards for hazardous air pollutants. These standards are enforced at the local level with USEPA oversight and are further discussed under local LORS and conformance below.

Administering Agency: BAAQMD, with USEPA Region IX oversight.

State

Nuisance Regulation

Authority: CA Health & Safety Code §41700

Requirements: Provides that "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."

Administering Agency: CARB and BAAQMD

Toxic "Hot Spots" Act (AB 2588)

Authority: H& SC §44300-44384; 17 CCR §93300-93347

Requirements: Requires preparation and periodic updating of inventory of facility emissions of hazardous substances listed by CARB, in accordance with CARB's regulatory guidelines. Risk assessments are to be prepared by selected facilities based upon local priorities and risk scoring criteria.

Administering Agency: BAAQMD and CARB

CEC and CARB Memorandum of Understanding

Authority: CA Pub. Res. Code §25523(a); 20 CCR §1752, 1752.5, 2300-2309 and Div. 2, Chap. 5, Art. 1, Appendix B, Part (k)

Requirements: Provides for the inclusion of requirements in the CEC's decision on an application for certification to assure protection of environmental quality; application is required to include information concerning air quality protection.

Administering Agency: California Energy Commission

Local

Authority: CA Health & Safety Code §40001

Requirements: Prohibit emissions and other discharges (such as smoke and odors) from specific sources of air pollution in excess of specified levels.

Administering Agency: BAAQMD, with CARB oversight.

8.1.4.2 Conformance of Facility

As addressed in this section, the PPP is designed, and will be constructed and operated, in accordance with all relevant federal, state, and local requirements and policies concerning protection of air quality.

Federal and Bay Area Air Quality Management District Prevention of Significant Deterioration Program

USEPA has promulgated PSD regulations for areas that are in compliance with national ambient air quality standards (40 CFR 52.21). The PSD program allows new sources of air pollution to be constructed, or existing sources to be modified, while preserving the existing ambient air quality levels, protecting public health and welfare, and protecting Class I areas (e.g., specific national parks and wilderness areas). USEPA has delegated the authority to implement the PSD program to various California air pollution control districts, including the BAAQMD in which the PPP is located (40 CFR 52.21(u)).

The five principal elements of the federal PSD program are:

- Applicability
- Best available control technology
- Pre-construction monitoring
- Increments analysis
- Air quality impact analysis

The PSD requirements apply on a pollutant-specific basis to any project that is a new major stationary source or a major modification to an existing stationary source. (These terms are defined in federal regulations at 40 CFR 52.21) The determination of applicability is based on evaluating the emissions changes associated with the proposed project in addition to all other emissions changes at the same location since the applicable PSD baseline dates (40 CFR 52.21).

Under the BAAQMD PSD program (Regulation 2, Rule 2), best available control technology (BACT) must be applied when a new or modified source shows emission increases in excess of 10 pounds per highest day of precursor organic compounds (POC), nonprecursor organic compounds (NPOC), NO_x,

SO_2, PM_{10}, or CO. The BAAQMD program also dictates that a permit for a project will be denied if specified emissions thresholds are exceeded unless air dispersion modeling shows that ambient air quality standards will not be violated and the applicable PSD increments, as defined in the PSD rule, will not be exceeded. The BAAQMD PSD emission threshold levels for requiring modeling are shown in Table 8.1-11. The PSD modeling requirements apply to all facilities with cumulative increases in emissions that exceed the levels shown in Table 8.1-11 on a pollutant-specific basis since the applicable PSD baseline date.

Table 8.1-11. BAAQMD PSD significant emission threshold levels.

Pollutant	Threshold Level
PM_{10}	15 tpy
NO_x	40 tpy
SO_2	40 tpy
POC	40 tpy
CO	100 tpy

The BAAQMD PSD program applies, on a pollutant-specific basis, only to a new major stationary source or to a major modification of an existing major stationary source that meets the following criteria:

- A new facility that will emit 100 tons per year (tpy) or more, and is one of the 28 PSD source categories in the federal Clean Air Act or any new facility that will emit 250 tpy or more; or
- A facility that emits 100 tpy or more with net emissions increases since the applicable PSD baseline date that exceed the threshold levels shown in Table 8.1-11.

Federal New Source Performance Standards

The Standards of Performance for New Stationary Sources are source-specific federal regulations, limiting the allowable emissions of criteria pollutants (i.e., those that have a national ambient air quality standard). These regulations apply to certain sources depending on the equipment size, process rate, and/or the date of construction, modification, or preconstruction of the affected facility. Recordkeeping, reporting, and monitoring requirements are usually necessary for the regulated pollutants from each subject source; the reports must be regularly submitted to the reviewing agency (40 CFR 60.4). As with the PSD program, this program has been delegated by USEPA to the BAAQMD. A summary of the BAAQMD New Source Performance Standards applicable to the project is provided in Section 8.1.4.2.9.

National Emissions Standards for Hazardous Air Pollutants

The National Emissions Standards for Hazardous Air Pollutants (NESHAPs) are either source-specific or pollutant-specific regulations, limiting the allowable emissions of hazardous air pollutants from the affected sources (40 CFR 61). Unlike criteria air pollutants, hazardous air pollutants do not have a national ambient air quality standard but have been identified by USEPA as causing or contributing to the adverse health effects of air pollution.

Administration of the hazardous air pollutants program has been delegated to the BAAQMD and is described in Section 8.1.4.2.10 (40 CFR 61.04).

Federal Clean Air Act Amendments of 1990

In November 1990, substantial revisions and updates to the federal Clean Air Act were signed into law. This complex enactment addresses a number of areas that could be relevant to the PPP, such as State

Implementation Plan requirements for nonattainment areas that set new compliance deadlines and annual progress increments, more extensive permitting requirements, new USEPA mandates and deadlines for developing rules to control air toxic emissions, and acid deposition control. Following is a summary of the provisions applicable to this project.

Title IV - Acid Deposition Control

This title requires the reduction of emissions of acidic compounds and their precursors (42 USC §7651 et seq.). The principal source of these compounds is the combustion of fossil fuels. Other requirements include monitoring and recordkeeping for emissions of SO_2 and NO_x and for opacity and volumetric flow.

Title V - Operating Permits

This title establishes a comprehensive operating permit program for major stationary sources (42 USC §7661 et seq.). Under the Title V program, a single permit that includes a listing of all the stationary sources, applicable regulations, requirements, and compliance determination is required.

The BAAQMD's Major Facility Review Program (Regulation 2, Rule 6) has been approved by USEPA and includes the acid rain program. Consequently, the BAAQMD has received delegation to implement the Title IV and V programs.

California Clean Air Act

AB 2595, the California Clean Air Act (Act), was enacted by the California Legislature and became law in January 1989. The Act requires the local air pollution control districts to attain and maintain both the federal and state ambient air quality standards at the "earliest practicable date." The Act contains several milestones for local districts and the California Air Resources Board. In 1993, the BAAQMD submitted to the Air Resources Board an air quality plan defining the program for meeting the required emission reduction milestones in the Bay Area. Several updates to the original plan have also been submitted.

Air quality plans must demonstrate attainment of the state ambient air quality standards and must result in a five percent annual reduction in emissions of nonattainment pollutants (ozone, CO, NO_x, SO_2, and their precursors) in a given district (H&SC §40914). A local district may adopt additional stationary source control measures or transportation control measures, revise existing source-specific or new source review rules, or expand its vehicle inspection and maintenance program (H&SC §40918) as part of the plan. District air quality plans specify the development and adoption of more stringent regulations to achieve the requirements of the Act. The applicable regulations that will apply to the PPP are included in the discussion of BAAQMD prohibitory rules in Section 8.1.4.2.8.

BAAQMD New Source Review Requirements

BAAQMD Regulation 2, Rule 2, New Source Review, requires that a pre-construction review be conducted for all proposed new or modified sources of air pollution. New Source Review contains three principal elements:

- Best available control technology (BACT)
- Emissions offsets
- Air quality impact analysis

BACT is required for all new sources or modifications of existing sources if emission increases caused by the project exceed 10 pounds per highest day of any criteria air pollutant. The district rule also contains separate BACT thresholds for numerous "non-criteria" pollutants, such as lead and various sulfur compounds.

The BAAQMD regulation further requires that for new or modified sources emitting in excess of 50 tons per year of POCs or NO_x, the total project emissions must be offset (i.e., an emission reduction comparable to the emission increase attributable to the source must be achieved at the project site or at another location) at a ratio of 1.15:1. To ensure that there is no net increase in regional emissions as a result of new or modified sources, offsets at a ratio of 1.0 to 1.0 must be provided, for facilities emitting more than 15 but less than 50 tons per year of POCs or NO_x. Such offsets may be provided by the District from the Small Facility Banking account. If the Small Facility Bank has been exhausted, the applicant must provide the offsets. In some instances, where applicable, NOx and POC sources are required to also offset any existing cumulative emissions increase which have occurred after April 5, 1991.

Emisisons offsets for CO, SO_x, and PM_{10} are required for new facilities which propose emissions levels in excess of 100 tons/yr, or for non-major facilities which propose emissions increases in excess of 100 tons/yr.

In addition, a Major Facility (100 tpy facility) is required to offset net emissions increases from a project, on a pollutant-specific basis, in excess of 1 tpy of PM_{10} and SO_2 that have occurred or will occur after April 5, 1991.

For the BAAQMD, the air quality impact analysis is the same as the PSD requirement: the project must not cause a violation or interfere with the maintenance of any ambient air quality standards or applicable increments. Finally, the district may impose appropriate monitoring and reporting requirements to ensure compliance.

District Regulation 2, Rule 3 specifies procedures for review and standards for approval of Authorities to Construct power plants within the District. The applicant must obtain a Determination of Compliance and an Authority to Construct from the District prior to commencing construction. An application for a Determination of Compliance and an Authority to Construct is expected to be filed with the BAAQMD within one week of the filing of the AFC with the CEC. As the USEPA has delegated permitting authority to the BAAQMD, no application to the USEPA is required for this project.

Risk Management Policy

The District has developed a procedure for reviewing permit applications for projects that will emit compounds that may result in health impacts. The procedure requires comparing the potential emissions of toxic air contaminants from the project to specific district established levels, and requires the preparation of a written risk screening analysis if the levels are exceeded. The screening analysis includes estimates of the maximum hourly and annual concentrations of the toxic air contaminants, calculations of cancer risk, and comparison of maximum modeled concentrations with appropriate non-cancer threshold levels. The use of best available control technology for toxic air contaminant emissions (T-BACT) is required if the incremental cancer risk from the project is projected to be between 1 and 10 in 1 million.

Other BAAQMD Regulatory Requirements

As required by the federal Clean Air Act and the California Clean Air Act, plans that demonstrate attainment must be developed for those areas that have not attained the national and state air quality standards (42 USC §7401; H&SC §40912). As part of its plan, the BAAQMD has developed regulations limiting emissions from specific sources. These regulations are collectively known as "prohibitory rules," because they prohibit the construction or operation of a source of pollution that would violate specific emission limits.

The general prohibitory rules of the BAAQMD applicable to the PPP are as follows:

Regulation 1-301—Public Nuisance

Prohibits emissions in quantities that adversely affect public health, other businesses, or property.

Regulation 6—Particulate Matter and Visible Emissions

Limits the visible emissions from the project to no darker than No. 1 when compared to a Ringelmann Chart for a period or periods aggregating more than 3 minutes in any hour. Opacity is limited to no greater than 20 percent from any source for a period or periods aggregating 3 minutes in any hour. Particulate emission concentrations cannot exceed 0.15 grains per dry standard cubic foot of exhaust gas volume.

Regulation 7—Odorous Substances

Limits emission concentrations of dimethylsulfide, ammonia, mercaptan, phenols, and trimethylamine. This regulation becomes applicable upon confirmation of 10 or more odor complaints from the public within a 90-day period. Once the rule becomes applicable, it remains in effect for one year and can be re-triggered with the receipt of 5 or more odor complaints within a 90-day period.

Regulation 9, Rule 1—Sulfur Dioxide

Limits stationary source emissions of sulfur dioxide to less than 300 ppm. In addition, the rule restricts sulfur dioxide emissions that will result in ground-level concentrations in excess of 0.5 ppm continuously for 3 consecutive minutes, 0.25 ppm averaged over 60 consecutive minutes, or 0.05 ppm averaged over 24 hours.

Regulation 9, Rule 2—Hydrogen Sulfide

Limits the emission of hydrogen sulfide during any 24-hour period in such quantities that result in ground-level hydrogen sulfide concentrations in excess of 0.06 ppm averaged over 3 consecutive minutes or 0.03 ppm averaged over any 60 consecutive minutes.

Regulation 9, Rule 3—Nitrogen Oxides From Heat Transfer Operations

Limits emissions of nitrogen oxides from new or modified heat transfer operations to less than 125 ppm.

Regulation 9, Rule 9—Nitrogen Oxides from Stationary Gas Turbines

Limits emissions of nitrogen oxides from gas turbines during baseload operations to less than 9 ppmv corrected to 15 percent oxygen.

Regulation 11, Rule 10—Hexavalent Chromium Emissions From Cooling Towers

Limits hexavalent chromium emissions from cooling towers by eliminating the use of chromium-based chemicals.

BAAQMD New Source Performance Standards

Regulation 10 (40 CFR 60 subpart GG) - Standards of Performance for Stationary Gas Turbines. The BAAQMD has adopted by reference the federal New Source Performance Standard (NSPS) for stationary gas turbines. This regulation requires monitoring of sulfur and nitrogen in the fuel; limits emissions of NO_x and SO_2 emissions; requires source testing of emissions; requires emissions monitoring; and requires recordkeeping for the collected data.

BAAQMD Hazardous Air Pollutants

As noted, the BAAQMD is enforcing the federal NESHAP regulations. Although none of the NESHAPs apply to the proposed project, gas turbines are included in the MACT Standards List Affected by FCAA Section 112(j), "MACT Hammer" provisions. The facility will work closely with the BAAQMD on any required application filings. Presently, the applicant believes that BACT proposed for criteria pollutants will also meet MACT control technology provisions.

BAAQMD Title IV and Title V Programs

BAAQMD Regulation 2, Rule 6 —Major Facility Review

This rule implements the operating permit requirements of Title V of the federal Clean Air Act. The rule applies to major facilities, Phase II acid rain facilities, subject solid waste incinerator facilities, and any facility listed by USEPA as requiring a Title V permit. As a Phase II acid rain and NSPS affected facility, the PPP will be required to submit a permit application to undergo a major facility review within 12 months of commencement of facility operation.

The BAAQMD has adopted by reference the federal Title IV (Acid Rain) Regulation and is now responsible for implementing the program through the Title V operating permit program. Under Title IV, a project must comply with maximum operating emissions levels for SO_2 and NO_x and is required to install and operate continuous monitoring systems for SO_2, NO_x, and CO_2 emissions. Extensive recordkeeping and reporting requirements are also part of the acid rain program.

A summary of the demonstration of compliance with applicable LORS is given at the end of this chapter in Table 8.1-36.

8.1.5 Environmental Consequences

8.1.5.1 Overview of the Analytical Approach to Estimating Facility Impacts

The emissions sources at the PPP include two gas turbines with heat recovery steam generators equipped with supplemental burners (duct burners), and a wet, mechanical-draft cooling tower. The actual operation of the turbines will be under "base load" conditions, i.e., ~100 percent of their maximum rated output. Supplemental firing will be provided by the duct burners as needed to achieve the required power generation level. A chilled inlet air system will also be used to increase power output under certain conditions. Emission control systems will be fully operational during all operations except during startups and shutdowns. Maximum annual emissions are based on operation of the PPP at maximum firing rates and include the expected maximum number of startups that may occur in a year. Each turbine startup will result in transient emission rates until steady-state operation for the gas turbine and emission control systems is achieved.

Ambient air quality impact analyses for the site have been conducted to satisfy the CEC requirements for criteria pollutants (NO_2, CO, PM_{10}, and SO_2), noncriteria pollutants, and construction impacts have been addressed on a pollutant-specific basis. It should be noted that the operational scenarios having the highest emissions rates do not necessarily produce the highest ambient impacts. The following sections describe the emission sources that have been evaluated for the PPP, the ambient impact analyses results, and the evaluation of facility compliance with the applicable air quality regulations, including BAAQMD Regulation 2 (Permits), and Rule 2 (New Source Review). Rule 2 includes both the District's NSR and PSD requirements.

Facility Emissions

The proposed project will be a new source. As discussed in Section 2, the new equipment will consist of two GE LM6000 PC Sprint combustion turbines (or equivalent), rated at 50 MW (nominal net, at site design conditions); two heat recovery steam generators (HRSGs) equipped with duct burners rated at 136.9 MMBtu/hr; a 57 MW condensing steam turbine-generator; and a 3-cell cooling tower. Natural gas will be the only fuel consumed during operation of the PPP. Typical specifications for the natural gas fuel are shown in Table 8.1-12.

The turbine design specifications are as follows:

Manufacturer	General Electric
Model	LM 6000 PC
Fuel	Natural Gas
Nominal heat input	~473.7 mmBtu/hr (HHV)
Nominal power generation	~50 MW
Turbine exhaust temperature	~850 deg F
Exhaust flow	~ 619, 630 acfm
Exhaust O_2 %	~12.90%
Exhaust CO_2 %	~ 3.251%
Exhaust moisture %	~ 10.8%

The cooling tower design specifications are as follows:

Manufacturer	GEA (or equivalent)
Number of cells	3 (plume-abated counterflow design)
Cell ACFM	~ 1,259,000
Fan stack diameter	29.33 ft.
Drift rate	0.0005%
Average TDS	3,745 ppmw
Tower crculation rate	~ 34,980 gpm
Dimensions	126 ft length, 42 ft. width
Deck height	52 ft.
Fan exhaust height	62 ft.

The HRSG design specifications are as follows:

Manufacturer	Not specified
Duct burner heat input	~ 136.9 MBtu/hr
Fuel	Natural Gas
Dimensions	124 ft. length, 20 ft. width
Height	75 ft. (centerline of steam drum)

Natural gas combustion results in the formation of NO_x, SO_2, unburned hydrocarbons (POC), PM_{10}, and CO. Because natural gas is a clean burning fuel, there will be minimal formation of combustion PM_{10} and SO_2. The combustion turbines will be equipped with standard combustors with water injection that minimize the formation of NO_x and CO. To further reduce NO_x and CO emissions, selective catalytic reduction (SCR) and oxidation catalyst control systems will be utilized. Similarly, the duct burners will also be equipped with a low-NO_x burner design that minimizes NO_x formation.

Table 8.1-12. Typical chemical characteristics and heating value of natural gas.

Constituent	Mole %
Nitrogen	0.862
CO_2	0.047
Methane	98.950
Ethane	0.095
Oxygen	0.047
Total	99.998
Physical Data	
Dew point	-20 deg F
Moisture	6 lbs/Mcf
Specific gravity	0.559
LHV	900 Btu/scf
HHV	23,970 Btu/lbm 1,005 Btu/scf

Various noncriteria pollutants will also be emitted by the facility, including ammonia (NH_3), which is used as a reactant by the SCR system to control NO_x, and sulfate (or secondary particulate matter) due to the oxidation of the SO_2 emitted by the facility. Emissions of all of the criteria and noncriteria pollutants have been characterized and quantified in this application.

Table 8.1-13. Maximum short term pollutant emission rates per gas turbine[1].

Pollutant	ppmvd @ 15% O_2[3]	lb/MMBtu	lb/hr[3]
NO_x	2.5[2]	0.0093	4.4
CO	4.00[2]	0.00906	4.29
POC	2.00[2]	0.00253	1.2
PM_{10}[4]	--	0.00633	3.0
SO_2[5]	0.120	0.000676	0.32

[1]Emission rates shown reflect the highest value with no power augmentation, and no duct burners at any operating load except startup and shutdown.
[2]PPP design criteria.
[3]Pounds per hour and ppm provided by vendor; lb/MMBtu calculated from lb/hr.
[4]100 percent of particulate matter emissions assumed to be emitted as PM_{10}; PM_{10} emissions include both front and back half as those terms are used in USEPA Method 5.
[5]Based on maximum fuel sulfur content of 4 ppmv.

Criteria Pollutant Emissions

The gas turbines and duct burner emission rates have been estimated from vendor data, PPP design criteria, and established emission calculation procedures. The emission rates for the combustion turbines alone, the combustion turbines with duct burners and power augmentation in operation are shown in Tables 8.1-13, and 8.1-14, respectively.

The maximum firing rates, daily and annual fuel consumption rates, and operating restrictions define the allowable operations that determine the maximum potential hourly, daily, and annual emissions for each pollutant. These allowable operations are typically referred to as "the operating envelope" for a facility. The maximum heat input rates (fuel consumption rates) for the gas turbines, and gas turbines with duct burners are shown in Table 8.1-15.

Table 8.1-14. Maximum short term pollutant emission rates—each turbine with duct burner with power augmentation[a].

Pollutant	ppmvd @ 15% O_2[2]	lb/MMBtu	lb/hr[2]
NO_x	2.5[1]	0.0119	5.61
CO	4.0[1]	0.0116	5.47
POC	2.0[1]	0.00338	1.6
PM_{10}[3]	-	0.0091	4.3
SO_2[4]	0.120	0.000867	.41

[1]PPP design criteria.
[2]Pounds per hour and ppm provided by vendor; lb/MMBtu calculated from lb/hr.
[3]100 percent of particulate matter emissions assumed to be emitted as PM_{10}; PM_{10} emissions include both front and back half as those terms are used in USEPA Method 5.
[4]Based on maximum fuel sulfur content of 4 ppmv.

Table 8.1-15. Maximum device heat input rates (HHV) (mmBtu).

Period	Gas Turbines w/ Duct Burners[1]	Gas Turbines w/o Duct Burners[2]
Per hour	1221.2	947.4
Per day	Note 3	Note 3
Per year	Note 3	Note 3

[1] Based on maximum heat input for full load operation at 94 deg. F plus duct burner with inlet chillers.
[2] Based on maximum heat input for full load turbine operation at 33 deg. F.
[3]Daily and annual heat input rates are highly variable due to the wide capability of the turbines and duct burners to operate at various loads on a daily and annual basis.
Natural gas @ 1005 btu/scf (HHV), see App 8.1A, Table 8.1A-9 for approximate fuel use calculations.

Maximum emission rates expected to occur during a startup or shutdown are shown in Table 8.1-16. PM_{10} and SO_2 emissions have not been included in this table because emissions of these pollutants will be lower during a startup or shutdown period than during baseload facility operation.

Table 8.1-16. Maximum facility startup/shutdown emission rates[1].

	NO_x	CO	POC
Cold Start, lb/hr[2]	49	45	3
Shutdown, lb/hr[3]	(4)	(4)	3
Hot start, lbs/hr[3]	49	45	3

[1]Estimated based on vendor data. See Appendix 8.1A, Table 8.1A-1.
[2]Maximum of one-half hour per cold start.
[3]Maximum of one-half hour per hot start, and one-half hour per shutdown.
[4] Hot start and cold start emissions include shutdown emissions for a maximum 1 hour time period

The analysis of maximum facility emission levels was based on the pollutant emission factors shown in Tables 8.1-13, 8.1-14, 8.1-15, and 8.1-16; the PPP operating envelope shown in Table 8.1-17; the PPP startup emission rates shown in Table 8.1-16; and the ambient conditions that result in the highest emission rates. The maximum annual, daily, and hourly emissions for PPP are shown in Table 8.1-17. Detailed emission calculations appear in Appendix 8.1A, Table 8.1A-2. Emissions from the cooling tower were calculated from the predicted cooling water TDS level at seven cycles of concentration (see Table 8.1A-6).

Construction Emissions

Emissions due to the construction phase of the project have been estimated, including an assessment of emissions from vehicle and equipment exhaust and the fugitive dust generated from material handling. A detailed analysis of the emissions and ambient impacts is included in Appendix 8.1E. Construction emission mitigation and/or control techniques proposed for use at the PPP site, include, but are not limited to the following:

- Operational measures, such as limiting time spent with the engine idling by shutting down equipment when not in use;
- Regular preventive maintenance to prevent emission increases due to engine problems;
- Use of low sulfur and low aromatic fuel meeting California standards for motor vehicle diesel fuel; and
- Use of low-emitting gas and diesel engines meeting state and federal emissions standards for construction equipment, including, but not limited to catalytic converter systems and particulate filter systems.

The following mitigation measures are proposed to control fugitive dust emissions during construction of the project:

- Use either water application or chemical dust suppressant application to control dust emissions from on-site unpaved road travel and unpaved parking areas;
- Use vacuum sweeping and/or water flushing of paved road surface to remove buildup of loose material to control dust emissions from travel on the paved access road (including adjacent public streets impacted by construction activities) and paved parking areas;
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard;
- Limit traffic speeds on all unpaved site areas to 5 mph;
- Install sandbags or other erosion control measures to prevent silt runoff to roadways;
- Replant vegetation in disturbed areas as quickly as possible;
- Use wheel washers or wash off tires of all trucks exiting construction site; and
  Mitigate fugitive dust emissions from wind erosion of areas disturbed from construction activities (including storage piles) by application of either water or chemical dust suppressant.

The PPP construction site impacts are not unusual in comparison to most construction sites. Construction sites that use good dust suppression techniques and low-emitting vehicles typically do not cause violations of air quality standards.

Noncriteria Pollutant Emissions

Noncriteria pollutants are compounds that have been identified as pollutants that pose a significant health hazard. Nine of these pollutants are regulated under the federal New Source Review program; they are lead, asbestos, beryllium, mercury, fluorides, sulfuric acid mist, hydrogen sulfide, total reduced sulfur, and reduced sulfur compounds.[1] In addition to these nine compounds, the federal Clean Air Act lists 189 substances as potential hazardous air pollutants (Clean Air Act Sec. 112(b)(1)). The BAAQMD has also published a list of compounds it defines as potential toxic air contaminants (Toxics Policy, May 1991; Rule2-1-316). Any pollutant that may be emitted from the PPP and is on the federal New Source Review list, the federal Clean Air Act list, and/or the District toxic air contaminant list has been evaluated as part of the AFC. Emission factors were determined by reviewing the available technical data, determining the products of combustion, and/or using material balance calculations.

Table 8.1-17. Emissions from new equipment[1].

	NO_x	SO_2	CO	POC	PM_{10}
Maximum Hourly Emissions, lb/hr					
Turbines and duct burners[2]	54.6	0.73	50.5	4.6	7.29
Cooling tower	-	-	-	-	0.51
Total Project, pounds per hour[3]	54.6	0.73	50.5	4.6	7.8
Maximum daily emissions, lb/day					
Turbines and duct burners[2]	445.9	19.6	423.7	82.4	209.9
Cooling tower	-	-	-	-	12.3
Total project, pounds per day[3]	445.9	19.6	423.7	82.4	222.2
Maximum Annual Emissions, tpy					
Turbines and duct burners	51.5	2.93	49.5	11.5	28.1
Cooling tower	-	-	-	-	2.3
Total project, tons per year[3]	51.5	2.93	49.5	11.5	30.4

*Maximum annual NO_x emissions limit is based upon a 2.5 ppm, emission limit, seasonal annual site conditions and seasonal turbine performance profiles.
[1]See Appendix 8.1A, Table 8.1A-2 for calculations.
[2]Includes startup/shutdown emissions for one turbine and full load (duct burning) emissions for the other turbine.
[3]Numbers may not add directly due to rounding.

Noncriteria pollutant emission factors recommended by the BAAQMD staff were used for the analysis of emissions from the gas turbines. The recommended factors were taken from data compiled by the Ventura County APCD and from the California Air Toxics Emission Factors (CATEF) database. Noncriteria pollutant emissions from the cooling tower were calculated from an analysis of the proposed reclaim water as delivered to the cooling tower system (assuming seven cycles of concentration).

The noncriteria pollutants that may be emitted from the PPP, and their respective emission factors, are shown in Table 8.1-18. Appendix 8.1A, Tables 8.1A-3, 8.1A-4, and 8.1A-5 provides the detailed emission calculations for noncriteria pollutants.

[1] These pollutants are regulated under federal and state air quality programs; however, they are evaluated as noncriteria pollutants by the California Energy Commission.

Table 8.1-18. Noncriteria pollutant emissions for the PPP.

Pollutant	Emission Factor (lb/MMscf)	Emissions lb/hr	Emissions ton/yr
Gas Turbines (with duct burners) (each):			
Acetaldehyde	4.08×10^{-2}	0.0248	0.0881
Acrolein	3.69×10^{-3}	0.00224	0.00797
Ammonia	-[1]	6.78	29.7
Benzene	3.33×10^{-3}	0.00202	0.00719
1,3-Butadiene	1.27×10^{-4}	0.0000772	0.000274
Ethylbenzene	1.79×10^{-2}	0.0109	0.0387
Formaldehyde	1.10×10^{-1}	0.0668	0.238
Hexane	2.59×10^{-1}	0.157	0.559
Naphthalene	1.33×10^{-3}	0.000808	0.00287
Polycyclic Aromatics	1.65×10^{-4}	0.0001	0.000356
Propylene	7.70×10^{-1}	0.468	1.66
Propylene oxide	2.96×10^{-2}	0.018	0.0639
Toluene	7.10×10^{-2}	0.0431	0.153
Xylene	2.61×10^{-2}	0.0159	0.0564
Cooling Tower (ppm)			
Ammonia	7	0.000612	0.00268
Arsenic	0.0082	0.00000072	0.00000314
Cadmium	0.0035	0.000000306	0.00000134
Chromium (total)	0.007	0.000000612	0.00000268
Copper	0.021	0.00000184	0.000008
Lead	0.007	0.000000612	0.00000268
Mercury	0.000018	0.00000000157	0.00000000689
Nickel	0.049	0.00000428	0.0000188
Silver	0.007	0.000000612	0.00000268
Zinc	0.363	0.0000317	0.000139

[1]Ammonia emissions calculated from ammonia slip rate. See Appendix 8.1A, Table 8.1A-5.
Cooling tower data based on reclaim water use, 7 cycles of concentration.

Air Quality Impact Analysis

Air Quality Modeling Methodology

An assessment of impacts from the PPP on ambient air quality has been conducted using USEPA-approved air quality dispersion models. These models are based on various mathematical descriptions of atmospheric diffusion and dispersion processes in which a pollutant source impact can be calculated over a given area.

The impact analysis was used to determine the worst-case ground-level impacts of the PPP. It should be noted that the operational scenarios having the highest emissions rates do not necessarily produce the highest ambient impacts. The results were compared with established state and federal ambient air quality standards and PSD significance levels. If the standards are not exceeded then it is assumed that, in the operation of the facility, no exceedances are expected under any conditions. In accordance with the air quality impact analysis guidelines developed by USEPA (40 CFR Part 51, Appendix W: *Guideline on Air Quality Models) and CARB (Reference Document for California Statewide Modeling Guideline*, April 1989), the ground-level impact analysis includes the following assessments:

- Impacts in simple, intermediate, and complex terrain,

- Aerodynamic effects (downwash) due to nearby building(s) and structures, and
- Impacts from inversion breakup (fumigation).

Simple, intermediate and complex terrain impacts were assessed for all meteorological conditions that would limit the amount of final plume rise. Plume impaction on elevated terrain, such as on the slope of a nearby hill, can cause high ground-level concentrations, especially under stable atmospheric conditions. Another dispersion condition that can cause high ground-level pollutant concentrations is caused by building downwash. Building downwash can occur when wind speeds are high and a building or structure is in close proximity to the emission stack. This can result in building wake effects where the plume is drawn down toward the ground by the lower pressure region that exists in the lee side (downwind) of the building or structure.

Fumigation conditions occur when the plume is emitted into a low lying layer of stable air (inversion) that then becomes unstable, resulting in a rapid mixing of pollutants towards the ground. The low mixing height that results from this condition allows little diffusion of the stack plume before it is carried downwind to the ground. Although fumigation conditions rarely last as long as an hour, relatively high ground-level concentrations may be reached during that period. Fumigation tends to occur under clear skies and light winds. Such conditions are more prevalent in the summer.

The basic model equation used in this analysis assumes that the concentrations of emissions within a plume can be characterized by a Gaussian distribution about the centerline of the plume (see Figure 8.1-11). Concentrations at any location downwind of a point source such as a stack can be determined from the following equation:

$$C(x,y,z,H) = \left(\frac{Q}{2\pi\sigma_y\sigma_z u}\right) * \left(e^{-1/2(y/\sigma_y)^2}\right) * \left[\left\{e^{-1/2(z-H/\sigma_z)^2}\right\} + \left\{e^{-1/2(z+H/\sigma_z)^2}\right\}\right]$$

where:

C	=	the concentration in the air of the substance or pollutant in question
Q	=	the pollutant emission rate
$\sigma_y\sigma_z$	=	the horizontal and vertical dispersion coefficients, respectively, at downwind distance x
u	=	the wind speed at the height of the plume center
x,y,z	=	the variables that define the 3-dimensional Cartesian coordinate system used; the downwind, crosswind, and vertical distances from the base of the stack (see Figure 8.1-10)
H	=	the height of the plume above the stack base (the sum of the height of the stack and the vertical distance that the plume rises due to the momentum and/or buoyancy of the plume)

Gaussian dispersion models are approved by USEPA for regulatory use and are based on conservative assumptions (i.e., the models tend to overpredict actual impacts by assuming steady state conditions, no pollutant loss through conservation of mass, no chemical reactions, etc.). The USEPA models were used to determine if ambient air quality standards would be exceeded, and whether a more accurate and sophisticated modeling procedure would be warranted to make the impact determination. The following sections describe:

- Screening modeling procedures
- Refined air quality impact analysis
- Existing ambient pollutant concentrations and preconstruction monitoring
- Results of the ambient air quality modeling analyses
- PSD increment consumption

The screening and refined air quality impact analyses were performed using the Industrial Source Complex, Short-Term Model ISCST3 (Version 02035). ISCST3 is a Gaussian dispersion model capable of assessing impacts from a variety of source types in areas of simple, intermediate, and complex terrain. The model can account for settling and dry deposition of particulates; area, line, and volume source types; downwash effects, and gradual plume rise as a function of downwind distance. The model is capable of estimating concentrations for a wide range of averaging times (from one hour to one year).

Inputs required by the ISCST3 model include the following:

- Model options
- Meteorological data
- Source data
- Receptor data

Model options refer to user selections that account for conditions specific to the area being modeled or to the emissions source that needs to be examined. Examples of model options include use of site-specific vertical profiles of wind speed and temperature; consideration of stack and building wake effects; and time-dependent exponential decay of pollutants. The model supplies recommended default options for the user. Except where explicitly stated, such as for building downwash, as described in more detail below, default values were used. A number of these default values are required for USEPA and local District approval of model results and are listed below:

- Urban dispersion coefficients
- Stack tip downwash
- Buoyancy induced dispersion
- Calm processing
- Default urban wind profile exponents = 0.15, 0.15, 0.20, 0.25, 0.30, 0.30
- Default urban vertical temperature gradients = 0.0, 0.0, 0.0, 0.0, 0.02, 0.035
- 10 meter anemometer height (San Jose Airport)

ISCST3 uses hourly meteorological data to characterize plume dispersion. The representativeness of the data is dependent on the proximity of the meteorological monitoring site to the area under consideration; the complexity of the terrain, the exposure of the meteorological monitoring site, and the period of time during which the data are collected. The meteorological data set used in this analysis was determined to be representative of meteorological conditions at the PPP site and to meet the requirements of the USEPA "On-Site Meteorological Program Guidance for Regulatory Model Applications" (EPA-450/4-87-013, August 1995). The data were collected by the San Jose Airport during 1992-1995, and 1997, at its station approximately 1.0 mile southeast of the project site.

The required emission source data inputs to ISCST3 include source locations, source elevations, stack heights, stack diameters, stack exit temperatures and velocities, and emission rates. The source locations are specified for a Cartesian (x,y) coordinate system where x and y are distances east and north in meters, respectively. The Cartesian coordinate system used is the Universal Transverse Mercator (UTM) Projection, North American Datum (NAD) 27 . The stack height that can be used in the model is limited by federal and BAAQMD Good Engineering Practice (GEP) stack height restrictions, discussed in more detail below. In addition, ISCST3 requires nearby building dimension data to calculate the impacts of building downwash.

For the purposes of modeling, a stack height beyond what is required by Good Engineering Practices is not allowed (BAAQMD Regulation 2-2-418). However, this requirement does not place a limit on the actual constructed height of a stack. GEP as used in modeling analyses is the height necessary to ensure that emissions from the stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies, or wakes that may be created by the source itself, nearby structures, or nearby terrain obstacles. In addition, the GEP modeling restriction assures that any required regulatory control measure is not compromised by the effect of that portion of the stack that exceeds the GEP. The USEPA guidance ("Guideline for Determination of Good Engineering Practice Stack Height," Revised 6/85) for determining GEP stack height is as follows:

$$H_g = H + 1.5L$$

where

H_g = Good Engineering Practice stack height, measured from the ground-level elevation at the base of the stack

H = height of nearby structure(s) measured from the ground-level elevation at the base of the stack

L = lesser dimension, height or maximum projected width, of nearby structure(s)

In using this equation, the guidance document indicates that both the height and width of the structure are determined from the frontal area of the structure, projected onto a plane perpendicular to the direction of the wind.

GEP stack height was calculated at 185 ft, based on HRSG dimensions of 22.86m height, 23m length, and 8.6m width. The proposed stack height of 95 ft. does not exceed GEP stack height. Additonally, several offsite buildings exist within close proximity to the site. These structures range in height from 52.4 to 72.4 ft., and were included in the downwash analysis.

For regulatory applications, a building is considered sufficiently close to a stack to cause wake effects when the downwind distance between the stack and the nearest part of the building is less than or equal to five times the lesser of the height or the projected width of the building.

For the buildings analyzed as downwash structures, the building dimensions were obtained from building site plans obtained from the City of Santa Clara. The building dimensions were analyzed using the Building Profile Input Program (BPIP) to calculate 36 wind-direction-specific building heights and projected building widths for use in building wake calculations. The building dimensions used in the GEP analysis are shown in Appendix 8.1B, Tables 8.1B-1, 8.1B-2, and Figure 8.1B-1.

PRIME Dispersion Model

EPRI sponsored a study to develop and evaluate new, improved plume rise and building downwash algorithms. The downwash algorithms in the existing ISC3 model, currently recommended for regulatory application, were largely developed with data that represented neutral stability, moderate to high wind speeds, winds perpendicular to the building face, and non-buoyant or low buoyancy plumes. Some of the limitations of the ISC3 downwash algorithms are: 1) the location of the stack is not considered; 2) streamline deflection is not considered; 3) there is no linkage between plume material captured by the near wake and far wake concentrations; and 4) large concentrations predicted by ISC3 during light wind speed, stable conditions are not supported by observations. Proper treatment of all of the above factors is considered essential for an improved building downwash model.

The central approach used in ISC-PRIME is to explicitly treat the trajectory of the plume near the building, and to use the position of the stack and plume relative to the building to calculate interactions with the building wake. ISC-PRIME calculates the local slope of the mean streamlines as a function of projected building shape, and coupled with a numerical plume rise model, determines the change in plume centerline location with downwind distance. This incorporates the descent of the air containing the plume material, and rise of the plume relative to the streamlines due to buoyancy or momentum effects. The ISC-PRIME plume rise is computed using a numerical solution of the mass, energy and momentum conservation laws. A key feature of the plume rise calculation is the ability to include vertical wind shear effects, which are important for many buoyant releases from short stacks. Additionally, the wind speed deficit induced by the building is modified as a function of downwind distance from the building. The deficit also leads to increased plume rise from short stacks.

ISC-PRIME calculates enhanced turbulence intensity and velocity deficit values within the wake region. These values are a maximum at the lee wall of the building and decay with the two-thirds power downwind through the wake. Ambient turbulence intensity is inferred from the Briggs dispersion coefficient formulas for rural and urban locations. If the plume is released upwind of the wake, the plume initially grows at the ambient rate, and then plume dispersion in the wake and near field is determined using the enhanced turbulence and velocity deficits. As observed in wind-tunnels, both the horizontal and vertical dispersion coefficients are enhanced in the building wake (this virtually eliminates the suspiciously large predictions by ISC3 during light wind speed, stable conditions which are caused by only enhancing the vertical dispersion coefficient when the stack height is more than 20% higher than the building height). When the turbulence intensity within the wake has decayed to the ambient rate, a virtual source technique is used to transition to the ISC3 dispersion curves.

An additional limitation of ISCST3 is that the model is only valid for the far wake (defined in ISCST3 as the area beyond the lesser of three building heights or building widths). A separate EPA model, SCREEN3, is recommended by EPA for near wake concentrations. However, ISC-PRIME predicts concentrations in both the near and far wakes. The fraction of the plume captured by the near wake is well-mixed within the near wake. That plume mass is then re-emitted to the far wake as a volume source and added to the uncaptured primary plume. A transition zone between the near and far wakes is used to represent the unsteadiness of the near wake/far wake interface.

ISC-PRIME was used for the calculation of 24-hour PM_{10} concentration(s). Initial modeling with ISCST3 indicates that, with a 95-foot tall stack, the 24-hour PM_{10} significance level of 5 ug/m^3 would be exceeded solely due to downwash. In most cases where downwash is driving the impact analysis, simply raising the stack upwards usually solves the problem. Because the site is situated within the approach zone of the San Jose International Airport, simply raising the HRSG stack height to solve the problem is not advisable. Thus, ISC-PRIME was proposed in the modeling protocol for use because the stack height should be limited to 95 feet. Analysis of the structures driving the downwash impacts indicates that it is the off-site structures that are causing the 24-hour PM_{10} significance level to be exceeded. As the offsite buildings constitute a large structure, stack locations become important in determining downwash impacts, especially for sources located away from the offsite buildings. The advantage in using ISC-PRIME in this situation is that ISC-PRIME explicitly treats the trajectory of the plume near the building and uses the position of the stack and plume relative to the building to calculate interactions with the building wake.

As discussed below, the use of ISC-PRIME results in 24-hour PM_{10} concentration(s) being less than the applicable significance level for that pollutant. The Modeling Protocol is presented in Appendix 8.1B.

Screening Procedures

To ensure the impacts analyzed were for maximum emission levels and worst-case dispersion conditions, a screening procedure was used to determine the inputs to the impact modeling. The screening procedure analyzed the turbine operating conditions that would result in the maximum impacts on a pollutant-specific basis. The operating conditions examined in this screening analysis, along with their exhaust and emission characteristics, are shown in Appendix 8.1B, Table 8.1B. These operating conditions represent maximum and minimum turbine loads (100 percent down to 30 percent) at average, maximum, and minimum ambient operating temperatures (61 deg F, 94 deg F, and 33 deg F).

The operating conditions were screened for worst-case ambient impacts using USEPA's ISCST3 model and five (5) years of meteorological data collected at San Jose Airport, as described above. The results of the screening procedure are presented in Appendix 8.1B, Table 8.1B-6. The screening analysis showed that all maximum impacts (excluding 24-hr SO_2 and 8 -hr CO) under Case 11 (turbine operating at 100 percent load with inlet chilling and duct burning) were the highest for each pollutant and averaging period. The stack parameters for this turbine operating condition were then used in the refined modeling analyses to evaluate the modeled impacts of the entire project for each pollutant and the aforementioned averaging periods. Case 10 (full load w/duct burners and without inlet chilling) per the screening modeling showed the highest impacts for the 24-hour SO_2 and 8-hour COstandards.

The screening analysis included flat, simple, intermediate, and complex terrain. Terrain features were taken from one-second USGS DEM data and 7.5 minute quadrangle maps of the area. For the screening analysis, a coarse Cartesian grid of receptors spaced at 180 meters was used with a finer downwash grid, spaced at 10 meters, beginning at the PPP fenceline. The coarse grid extended over ten kilometers from the PPP in all directions; the downwash grid extended to between 400 and 500 meters from the fenceline.

Refined Air Quality Impact Analysis

The operating conditions and emission rates used to model the PPP are summarized in Table 8.1-19. As discussed above, the turbine stack parameters for Cases 10 and 11 were used in modeling the impacts for each pollutant and averaging period. The complete modeling input for each pollutant and averaging period is shown in Appendix 8.1B, Table 8.1B-5.

The model receptor grids were derived from one-second DEM data. Initially, a 180-meter coarse grid was extended to ten kilometers from the PPP in all directions. A 10-meter resolution downwash receptor grid was used as described above.

Thirty-meter refined receptor grids were used in areas where the coarse grid analyses indicated modeled maxima for each site plan would be located. A map showing the layout of each modeling grid around the site plan is presented in Figure 8.1-12.

Receptors for the refined modeling analysis were taken from one-second USGS DEM data for four 7.5-minute quadrangles and included Milpitas, San Jose West, San Jose East and Càlaveras Reservoir The coarse and refined grids contained a total of approximately 17739 receptors.

Under BAAQMD Regulation 2-1-128.4, the cooling tower is not exempt from District permitting requirements even though it will not be used for the evaporative cooling of process water. Therefore the evaluation of compliance with District requirements includes the cooling tower for both emissions calculation and modeling purposes. For the CEC's review, the cooling tower emissions have also been included.

Table 8.1-19. ISCST3 model input data: source characteristics for refined modeling (emissions in grams per second).

Unit	NO_x	SO_2	CO	PM_{10}
One-Hour Average:				
Turbine/duct burner 1	0.707	0.052	0.689	N/A
Turbine/duct burner 2	0.707	0.052	0.689	N/A
Cooling tower (3 cells)	N/A	N/A	N/A	N/A
Three-Hour Average:				
Turbine/tuct burner 1	N/A	0.052	N/A	N/A
Turbine/duct burner 2	N/A	0.052	N/A	N/A
Cooling tower (3 cells)	N/A	N/A	N/A	N/A
Eight-Hour Average:				
Turbine/duct burner 1	N/A	N/A	1.312	N/A
Turbine/duct burner 2	N/A	N/A	1.312	N/A
Cooling tower (3 cells)	N/A	N/A	N/A	N/A
24-Hour Average:				
Turbine/duct burner 1	N/A	0.052	N/A	0.542
Turbine/duct burner 2	N/A	0.052	N/A	0.542
Cooling tower (3 cells)	N/A	N/A	N/A	0.0022
Annual Average:				
Turbine/duct burner 1	0.739	0.052	N/A	0.542
Turbine/duct burner 2	0.739	0.052	N/A	0.542
Cooling tower (3 cells)	N/A	N/A	N/A	0.0022

Specialized Modeling Analyses

Fumigation Modeling

Fumigation occurs when a plume that was originally emitted into a stable layer is mixed rapidly to ground-level when unstable air below the plume reaches plume level. Fumigation can cause very high ground-level concentrations for short time periods, typically less than one hour. Two situations are addressed according to BAAQMD *Permit Modeling Guidance (August 2001)*:

- Type 1: Break-up of the nocturnal radiation inversion by solar warming of the earth surface (inversion breakup), which occurs in the morning after sunrise and
- Type 3: Shoreline fumigation caused by advection of pollutants from a stable marine environment to an unstable inland environment. This is required for stacks within 3 kilometers of the shoreline of a large body of water (the turbines are located 11.5 kilometers from the shore of the San Francisco Bay).

Only Type 1 fumigation was modeled with the USEPA model SCREEN3 (version 96043) as the closest distance to the shoreline (Type 3 fumigation) is approximately 10 kilometers. Only emissions from the HRSG stacks would be affected by fumigation. Fumigation impacts for the turbines were predicted to occur at a distance of 9304 meters from the turbine stacks (the ISCST3 maximum 1-hour impact occurs about 100 meters from the turbine stacks). The SCREEN3 1-hour fumigation impacts, as shown below (Table 8.1-20), are only 10% of the modeled ISCST3 maxima. Therefore, fumigation will not significantly affect the overall results of the modeling analyses.

Table 8.1-20. SCREEN3 1-hour fumigation impacts.

Pollutant	Fumigation impacts ($\Phi g/m^3$)	Maximum ISCST3 Impact ($\Phi g/m^3$)	Fumigation Percent of ISCST3 Maxima
NO_x	3.73	36.92	10%
SO_2	0.27	2.72	10%
CO	3.63	35.98	10%

Turbine Startup

Facility impacts were also modeled during the startup of two turbines within a one hour timeframe to evaluate short-term impacts under startup conditions. Emission rates used for these scenarios were based on an engineering analysis of available vendor data, as supplied by General Electric. A summary of the data evaluated in developing these emission rates was shown in Appendix 8.1A, Table 8.1A-1 and 8.1A-2. Turbine exhaust parameters for the minimum operating load point were used to characterize turbine exhaust during startup. Startup impacts were evaluated for both the one- and three-hour averaging periods using ISCST3. Emission rates and stack parameters used in the startup modeling analysis are shown in Table 8.1-21.

Ozone Limiting

With approval from the BAAQMD staff, one-hour and annual NO_2 impacts were modeled using ISC3_OLM (Industrial Source Complex, Version 3, Ozone Limiting Method) Model (version 96113). While this version of ISCST3 is not based on the latest model ISCST3 update, this modeling analysis does not include any features (such as area sources or pit retention) that were affected by recent model updates. Both versions of ISCST3 were run without the ozone-limiting feature to verify that the modeled results would not be affected by using the OLM version of the model.

ISC3_OLM uses hourly ozone data to perform ozone-limiting calculations on individual plumes on an hour-by-hour basis. Hourly ozone data from the San Jose 4th Street monitoring site for 1992-1995, and 1997, which is concurrent with the San Jose Airport met data for the same years was used in the OLM analysis.

Missing hours in the ozone data set were filled in using linear interpolation if the period of missing data was 2 hours or less. If the data were missing for 3 or more hours, an average of the ozone data during the corresponding time periods during the rest of the same month was used to fill in the missing hours.

Turbine Commissioning

There is only one high emission scenario possible during commissioning, i.e., 30% load. This scenario would be characterized as the period prior to SCR and CO control system commissioning, when the combustor is being tuned. Under this scenario, NO_x and CO emissions control systems (SCR and CO catalyst) would

Table 8.1-21. Emission rates and stack parameters used in modeling analysis for startup emissions impacts.

Parameter	Value
Turbine stack temperature	359.67 deg. K
Turbine exhaust velocity	16.76 m/s
One-hour average emissions[1]	
NO_x emission rate	6.174 g/s
CO emission rate	5.67 g/s

[1] PM_{10} and SO_2 emissions are less during startup than normal base load operations

not be functioning and the combustor would not be tuned for optimum performance. Notwithstanding the above, the water injection system for NO_x would be operational resulting in a partially controlled situation for NO_x.

Preconstruction Monitoring

To ensure that the impacts from the PPP will not cause or contribute to a violation of an ambient air quality standard or an exceedance of a PSD increment, an analysis of the existing air quality in the area of the PPP is necessary. BAAQMD rules require preconstruction ambient air quality monitoring data for the purposes of establishing background pollutant concentrations in the impact area (Regulation 2-2-414.3). However, a facility may be exempted from this requirement if the predicted air quality impacts of the facility do not exceed the *de minimis* levels listed in Table 8.1-22.

A facility may, with the District's approval, rely on air quality monitoring data collected at District monitoring stations to satisfy the requirement for preconstruction monitoring. In such a case, in accordance with Section 2.4 of the USEPA PSD guideline, the last three years of ambient monitoring data may be used if they are representative of the area's air quality where the maximum impacts occur due to the proposed source.

Table 8.1-22. BAAQMD PSD pre-construction monitoring exemption levels.

Pollutant	Averaging Period	*De minimis* Level
CO	8-hr average	575 $\mu g/m^3$
PM_{10}	24-hr average	10 $\mu g/m^3$
NO_2	annual average	14 $\mu g/m^3$
SO_2	24-hr average	13 $\mu g/m^3$

Results of the Ambient Air Quality Modeling Analyses

The maximum facility impacts calculated from each of the modeling analyses described above are summarized in Table 8.1-23 below. The results of the fumigation modeling analysis are summarized in Appendix 8.1B, Table 8.1B-6.

Table 8.1-23. Summary of results from refined modeling analyses.

Pollutant	Averaging Time	Modeled Concentration ($\mu g/m^3$)		
		ISCST3	Fumigation	Startup
NO_x	1-hour	36.91	3.73	193.42
	Annual	0.52	N/A	N/A
SO_2	1-hour	2.7	0.27	N/A
	3-hour	2.55	(2)	N/A
	24-hour	1.005	(2)	N/A
	Annual	0.038	N/A	N/A
CO	1-hour	35.99	3.63	393.99
	8-hour	51.41	(2)	N/A
PM_{10}[1]	24-hour	4.46	(2)	N/A
	Annual	0.889	N/A	N/A

Notes:
[1] Including cooling tower.
[2]Since the estimated 1-hour shoreline fumigation concentration is less than the maximum 1-hour concentration modeled using ISCST3, the effects of fumigation may be ignored (EPA-454/R-92-019, Section 4.5.3).

Preconstruction monitoring is not required because the maximum impacts did not exceed *de minimis* levels, as shown in Table 8.1-24.

Table 8.1-24. Evaluation of pre-construction monitoring requirements.

Pollutant	Averaging Time	Exemption Concentration ($\mu g/m^3$)	Maximum Modeled Concentration ($\mu g/m^3$)	Monitoring Required?
NO_x	annual	14	0.52	no
SO_2	24-hr	13	1.005	no
CO	8-hr	575	51.41	no
PM_{10}[1]	24-hr	10	4.46	no

[1]Including cooling tower.

Impacts During Turbine Commissioning

As discussed above, there is a single potential scenario under which NO_x impacts could be higher than under other operating conditions already evaluated.Under this scenario (30% load), NO_x emissions can be conservatively estimated to be equivalent to the guaranteed turbine-out level of 25 ppmvd @ 15 percent O2. If operation under this condition were to continue for one hour, maximum hourly NO_x emissions at 30% load would be (25 ppm) or 18 lbs/hr . CO emissions during commissioning periods would be equivalent to the uncontrolled startup value of 45 lbs/hr.

An ISCST3M modeling analysis using a NO_x emission rate of 18.0 lb/hr and the appropriate stack parameters indicates that the maximum modeled one-hour NO_2 impact during commissioning is 89.79 $\mu g/m^3$. With the maximum background NO_2 one-hour concentration of 244 $\mu g/m^3$, the maximum total impact would be 333.8 $\mu g/m^3$, which is well below the state one-hour NO_2 standard of 470 $\mu g/m^3$.

Modeling of turbine commissioning for CO emissions wasalso performed, with 1-hour impacts calculated at 224.47 ug/m^3.

Ambient Air Quality Impacts

To determine a project's air quality impacts, the modeled concentrations are added to the maximum background ambient air concentrations and then compared to the applicable ambient air quality standards. The modeled concentrations have already been presented in earlier tables. The maximum background ambient concentrations are listed in the following text and tables.

The BAAQMD monitors ambient air quality concentrations at several sites within the regional vicinity of the proposed plant site.

Table 8.1-25 presents the maximum established background concentrations used in the impacts analysis as derived from data collected at the following monitoring sites. Data on the specific monitoring sites is delineated in Section 8.1.3.

Table 8.1-25. Maximum background concentrations (1999-2001)[1].

Pollutant	Averaging Time	1999	2000	2001
San Jose 4th Street:				
NO_2 pphm	1-Hour	13	11	11
	Annual	2.6	2.5	ND
CO ppm	1-Hour	9.0	8.9	7.6
	8-Hour	6.28	7.03	5.10
PM^{10} ug/m^3	24-Hour	114	76	77
	Annual AM	28.7	26.7	28.0
	Annual GM	25.3	23.8	25.0
San Jose 4th Street Mountain View, and San Jose Piedmont:				
Ozone ppm	Max 1-Hour	.176	.096	.095
	3 Station Avg			
	Max 1-Hour Values	.132	.083	.092
San Francisco-Arkansas Street:				
SO_2 ppm	1-Hour	.03	.02	0.025
	3 Hour	.017	.016	.017
	24-hour	.007	.008	.008
	Annual	.002	.002	.002

[1]Highest value from all stations for each year

Maximum ground-level impacts due to operation of the PPP are shown together with the ambient air quality standards in Table 8.1-26. Using the conservative assumptions described earlier, the results indicate that the PPP will not cause or contribute to violations of any state or federal air quality standards, with the exception of the state PM_{10} standard. For this pollutant, existing concentrations already exceed the state standard.

Table 8.1-26. Modeled maximum project impacts.

Pollutant	Averaging Time	Maximum Facility Impact (μg/m^3)	Background (μg/m^3)	Total Impact (μg/m^3)	State Standard (μg/m^3)	Federal Standard (μg/m^3)
NO_2	1-hour	193.42	244	437.4	470	-
	Annual	0.520	49	49.52	-	100
SO_2	1-hour	2.7	78.6	81.3	650	-
	3-hour	2.55	44.2	46.75	-	1300
	24-hour	1.005	21	22.0	109	365
	Annual	0.038	8	8.04	-	80
CO	1-hour	393.99	10350	10744	23,000	40,000
	8-hour	26.91	7811	7862	10,000	10,000
PM_{10}[1]	24-hour	4.46	114	118.5	50	150
	Annual[2]	0.889	28.7	29.6	30	-
	Annual[3]	0.889	25.3	26.2	-	50

Notes:
[1]Including cooling tower
[2]Annual Arithmetic Mean
[3]Annual Geometric Mean
Worst-case one-hour NO_x impacts are dominated by gas turbines and duct burners.

PSD Increment Consumption

The Prevention of Significant Deterioration (PSD) program was established to allow emission increases (increments of consumption) that do not result in significant deterioration of ambient air quality in areas where criteria pollutants have not exceeded the National Ambient Air Quality Standards (NAAQS). For the purposes of determining applicability of the PSD program requirements, the following regulatory procedure is used:

- PPP emissions are evaluated to determine whether the potential increase in emissions will be significant. Since this facility is not a new major facility, an increment analysis is not required. The emissions increases are those that will result from the proposed new equipment. For new facilities that include mid to large gas turbines with fired HRSGs, USEPA considers a potential increase of 100 tons per year of any of the criteria pollutants to be significant. In this specific case, the PPP is not considered a new major source. Potential emissions increases are compared with the levels considered significant for new sources in Table 8.1-27.

Table 8.1-27. Comparison of emissions increase with PSD significance emissions levels.

Pollutant	Emissions (tons per year)	Significant Emission Levels (tons per year)[2]	Significant?
NO_x	51.5	40	no
SO_2	2.93	40	no
POC	11.5	40	no
CO	49.5	100	no
PM_{10}[1]	30.4	15	no

[1]Including cooling tower.
[2]Values apply only if the PPP is determined to be a major source.

- If an ambient impact analysis is required, the analysis is first used to determine if the impact levels are significant. The determination of significance is based on whether the impacts exceed established significance levels (BAAQMD Rule 2.2-233) shown in Table 8.1-28. If the significance levels are not exceeded, no further analysis is required.

Table 8.1-28. BAAQMD PSD levels of significance.

Pollutant	Averaging Time	Significant Impact Levels	Maximum Allowable Increments
NO_2	1-Hour	19 µg/m^3	N/A[1]
	Annual	1 µg/m^3	25 µg/m^3
SO_2	3-hour	25 µg/m^3	512 µg/m^3
	24-Hour	5 µg/m^3	91 µg/m^3
	Annual	1 µg/m^3	20 µg/m^3
CO	1-Hour	2000 µg/m^3	N/A
	8-Hour	500 µg/m^3	N/A
PM_{10}	24-Hour	5 µg/m^3	30 µg/m^3
	Annual	1 µg/m^3	17 µg/m^3

[1]The significance level for 1-hour average NO_2 is a BAAQMD level only.

- If the significance levels are exceeded, an analysis is required to demonstrate that the allowable increments will not be exceeded, on a pollutant-specific basis. Increments are the maximum increases in concentration that are allowed to occur above the baseline concentration. These PSD increments are also shown in Table 8.1-28.

Table 8.1-26 shows that the PPP will not be a major new source of any pollutant. Emissions of all pollutants from the PPP will be below the 100 ton per year major new source threshold. Since the PPP is not considered major for at least one criteria pollutant, PSD review and an increment analysis is not required for the entire facility.

Notwithstanding the above, the maximum modeled impacts from the PPP are compared with the significance levels in Table 8.1-29 below for informational purposes. These comparisons show that the PPP does not exceed any of the BAAQMD/PSD significance levels. As such, no multi-source modeling analyses were performed.

Table 8.1-29. Comparison of maximum modeled impacts and PSD significance thresholds.

Pollutant	Averaging Time	Maximum Modeled Impacts (µg/m^3)	Significance Threshold (µg/m^3)	Significant?
NO_2	1-Hour	36.91	19	no
	Annual	0.52	1	no
SO_2	3-Hour	2.55	25	no
	24-Hour	1.005	5	no
	Annual	0.038	1	no
CO	1-Hour	35.99	2000	no
	8-Hour	26.91	500	no
PM_{10}[1]	24-Hour	4.46	5	no
	Annual	0.889	1	no

[1]Including cooling tower.

8.1.5.2 Screening Health Risk Assessment

The screening health risk assessment (SHRA) was conducted to determine expected impacts on public health of the noncriteria pollutant emissions from the facility. The SHRA was conducted in accordance with the CAPCOA Air Toxics "Hot Spots' Program Revised 1992, Risk Assessment Guidelines" (October 1993) and the Bay Area Air Quality Management District "Risk Management Procedure" Policy (May 1991). The SHRA estimated the offsite cancer risk at the maximum impact receptor (MIR) location. If impacts at the MIR are below the significance thresholds with respect to cancer risk and acute and chronic health effects, then the impacts at all other identified receptors will also be insignificant. The CARB/OEHHA Health Risk Assessment computer program was used to evaluate multipathway exposure to toxic substances. Because of the conservatism (overprediction) built into the established risk analysis methodology, the actual risks will be lower than those calculated.

A health risk assessment requires the following information:

- Unit risk factors (or carcinogenic potency values) for any carcinogenic substances that may be emitted
- Noncancer Reference Exposure levels (RELs) for determining non-carcinogenic health impacts
- Annual average and maximum one-hour emission rates for each substance of concern
- The modeled maximum offsite concentration of each of the pollutants emitted

Pollutant-specific unit risk factors are the estimated probability of a person contracting cancer as a result of constant exposure to an ambient concentration of 1 μg/m3 over a 70-year lifetime. The SHRA uses unit risk factors specified by the California Office of Environmental Health Hazard Assessment (OEHHA). The cancer risk for each pollutant emitted is the product of the unit risk factor and the modeled concentration. All of the pollutant cancer risks are assumed to be additive.

An evaluation of the potential noncancer health effects from long-term (chronic) and short-term (acute) exposures has also been included in the SHRA. Many of the carcinogenic compounds are also associated with noncancer health effects and are therefore included in the determination of both cancer and noncancer effects. RELs are used as indicators of potential adverse health effects. RELs are generally based on the most sensitive adverse health effect reported and are designed to protect the most sensitive individuals. However, exceeding the REL does not automatically indicate a health impact. The OEHHA reference exposure levels were used to determine any adverse health effects from noncarcinogenic compounds. A hazard index for each noncancer pollutant is then determined by the ratio of the pollutant annual average concentration to its respective REL for a chronic evaluation. Each of the individual indices are summed to determine the overall hazard index for the project. Because noncancer compounds do not target the same system or organ, this sum is considered conservative. The same procedure is used for the acute evaluation.

The PPP SHRA results are compared with the established risk management procedures for the determination of acceptability. The established risk management criteria include those listed below:

- If the potential increased cancer risk is less than one in one million, the facility risk is considered not significant.
- If the potential increased cancer risk is greater than one in one million but less than ten in a million and Toxics-Best Available Control Technology (TBACT) has been applied to reduce risks, the facility risk is considered acceptable.

- If the potential increased cancer risk is greater than ten in one million and there are mitigating circumstances that, in the judgment of a regulatory agency, outweigh the risk, the risk is considered acceptable.
- For noncancer effects, total hazard indices of one or less are considered not significant.
- For a hazard index greater than one, OEHHA and the reviewing agency conduct a more refined review of the analysis and determine whether the impact is acceptable.

The SHRA includes the noncriteria pollutants listed above in Table 8.1-18. The receptor grid described earlier for criteria pollutant modeling was used for the SHRA. Receptors were also placed at each sensitive receptor identified in Appendix 8.1D, Table 8.1D-1 and shown in Figure 8.9-2.

The SHRA results for the PPP are presented in Table 8.1-30, and the detailed calculations are provided in Appendix 8.1D.

The screening HRA results indicate that the acute and chronic hazard indices are well below 1.0, and are therefore not significant. The maximum chronic noninhalation exposure was not established due to the lack of REL data for the specified substances and is therefore considered insignificant. The cancer burden value at 0.001 is also well below the significance level of 1.0. The cancer risk to a maximally exposed individual at the maximum impact receptor location is 0.133 in one million, well below the TBACT 10 in one million level. The screening HRA results indicate that, overall, the PPP will not pose a significant health risk.

Table 8.1-30. Screening health risk assessment results.

Risk type	Value
Cancer risk at maximum impact receptor	0.133 per million
Total cancer burden	0.001
Acute inhalation hazard index	0.205
Chronic inhalation hazard index	0.014
Chronic noninhalation exposure	NoValue Calculated

8.1.5.3 Visibility Screening Analysis

CALPUFF Modeling System

A screening mode of the CALPUFF modeling system was run for the proposed project in order to calculate potential impacts to Point Reyes National Seashore and Pinnacles National Monument, both managed by the National Park Service. The modeling analysis focused on the potential visibility impacts to protected areas in the vicinity of the project.

The modeling followed screening guidance as provided by the Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 2 Summary Report. The modeling procedures also incorporate comments provided by the Federal Land Managers' Air Quality Related Values workgroup (FLAG) Final Phase I report (December 2000).

The screening mode of the CALPUFF modeling system requires hourly, single-station meteorological data as input, both surface and upper air. Based on the guidance contained in the IWAQM Phase 2 Summary Report, CALPUFF was used in a screening mode, which required five years of single station meteorology. Five years of surface and upper air data were obtained for Moffet Field surface and Oakland upper air (1988-1993).

The PCRAMMET meteorological preprocessor, as recommended by the IWAQM Phase 2 Report, was used to process the surface, precipitation, and upper air data. PCRAMMET requires complete data sets of the following variables: wind speed, wind direction, temperature, ceiling height, opaque cloud cover or total cloud cover, surface pressure, relative humidity, and precipitation type. The five years of upper air data includes twice-daily mixing heights.

PCRAMMET was run with wet deposition options as required in the Phase 2 Report. As such, the following domain averaged variables are required and were based on values expected in the modeling region:

- Precipitation data
- Minimum Obukhov length = 2 meters
- Surface roughness length = 0.25 meters (at both measurement and application site)
- Noon time albedo = 0.29
- Bowen ratio = 1.75
- Fraction of net radiation absorbed by ground = 0.15
- Anthropogenic heat flux = 0.0 W/m^2

Five years of data was preprocessed with PCRAMMET, which was then used as input into CALPUFF.

CALPUFF also requires domain averaged background ozone (O_3) and ammonia (NH_3) concentrations for the Mesopuff II chemistry algorithm. For O_3, a domain-averaged value of 176 ppb was used, which was based on background O_3 data collected in the project region by the Bay Area Air Quality Monitoring District. For NH_3, a domain average value of 10.0 ppb was selected and was based on guidance in the IWAQM Phase 2 Report .

CALPUFF Model Options

A CALPUFF control file was generated that included IWAQM recommended defaults for the model options. This included rural dispersion coefficients, default wind speed profile exponents, and default vertical potential temperature gradient. Model options are listed in the CALPUFF model output, which is included on compact disk. A brief summary of the options used in the modeling analysis are listed below:

- Number of X grid cells = 2
- Number of Y grid cells = 2
- Number of vertical layers = 1
- Grid spacing = 210 km
- Cell face heights = 5000 meters
- Minimum mixing height = 50 meters
- Maximum mixing height = 5000 meters (based on observational data)
- Minimum wind speed allowed for non-calm conditions = 0.5 m/s
- Vertical distribution used in the near field = gaussian

- Terrain adjustment method = partial plume path adjustment
- No puff splitting allowed
- Chemical mechanism = Mesopuff II
- Wet and dry removal modeled
- Dispersion coefficients = PG dispersion coefficients
- PG sigma-y and z not adjusted for roughness
- Partial plume penetration of elevated inversion allowed
- Lateral turbulence not used

The computational grid extended 50 kilometers beyond the furthest receptor point.

Receptors were placed in three polar receptor rings surrounding the proposed modification. The radius was set equal to the distance from the source to the Point Reyes National Seashore, and similarly for Pinnacles National Monument. The receptors were spaced at one-degree intervals (360 receptors per receptor ring). The closest receptor ring was placed at a distance where it extends through the portion of the Class I area located closest to the proposed project. The middle receptor ring was placed at a distance where it extends through the central portion of the Class I area. The farthest receptor ring was placed at a distance where it extends through the most distant portion of the Class I area. A single elevation value was assigned to all receptors on a given ring. The selected elevation value was based on the average elevation of the arc length that extended into the Class I Area.

Following the IWAQM screening method, the maximum concentration for each pollutant, for each distance averaging time modeled was selected for comparison with the appropriate AQRV.

To assess visibility impacts at Point Reyes and Pinnacles, Flag Phase I report guidance was followed to determine the background visual range on a month-by-month basis. The allowable level of acceptable change (LAC) to extinction is 5 percent. The existing extinction at Point Reyes is 16.678 Mm^{-1}, while the existing extinction at Pinnacles is 16.222 Mm_{-1}.

Emissions

As stated earlier, the combustion sources at the proposed project will utilize advanced NO_x and CO control technology and natural gas fuel to achieve very low emission rates. Emissions from the project include NO_x, SO_2, and PM_{10}, all of which have the potential to interfere with visibility. Emissions used in the ISCST3 modeling analysis of visibility impacts are the same as those used for the criteria pollutant modeling analysis. The parameters modeled for the visibility impacts assume that the particulate nitrate (NO_3-) is in the form of ammonium nitrate (NH_4NO_3) and that particulate sulfate (SO_4) is in the form of ammonium sulfate ((NH_4)2SO_4). The visibility calculation is based on the ambient concentrations of NH_4NO_3, (NH_4)2SO_4, and PM_{10} along with a monthly relative humidity adjustment factor.

Impacts

The maximum 24-hour visibility impact was generated by taking the maximum 24-hour average modeled concentration at each receptor, regardless of the season in which it occurred, and assigning it to represent the visibility impact at Point Reyes or Pinnacles.

To calculate extinction coefficients, the following general equation was used:

$$b_{ext} = b_{SN} * f(RH) + b_{dry}$$

where:

b_{ext} = particle scattering coefficient
b_{SN} = $3[((NH_4)2SO_4) + (NH_4NO_3)]$
b_{dry} = b_{fine}

The quantities in brackets are the masses expressed in $\mu g/m^3$ and can further be broken down into the following equations:

b_{NO3} = $3[1.29(NO_3)f(RH)]$
b_{SO4} = $3[1.375(SO_4)f(RH)]$
b_{fine} = $1.0[PM_{10}]$

Using the above equations to calculate the extinction coefficients and correcting for f(RH) except for b_{fine}, which is not corrected), Table 8.1-31 summarizes the maximum extinction coefficients for each year for each pollutant and the total extinction.

Table 8.1-31. Maximum modeled impacts in protected areas.

Class I Area	b_{NO3} (Mm^-1)	b_{SO4} (Mm^-1)	b_{fine} (Mm^-1)	24-hour Average Visibility Impact (Mm^-1)	Percent Change in Extinction
Point Reyes	0.185	0.004	0.019	0.209	1.25%
Pinnacles	0.003	0.136	0.014	0.154	0.95%

Thus, during operation of the proposed project, potential visibility impacts to Point Reyes National Seashore and Pinnacles National Monument will be less than the 5 percent level of acceptable change.

8.1.5.4 Construction Emissions and Impacts Analysis

Emissions due to the construction phase of the project have been estimated, including an assessment of emissions from vehicle and equipment exhaust and the fugitive dust generated from material handling. A dispersion modeling analysis was conducted based on these emissions. A detailed analysis of the emissions and ambient impacts is included in Appendix 8.1E. With the exception of the 24-hour PM_{10} concentrations, the results of the analysis indicate that the maximum construction impacts will be below the state and federal standards for all the criteria pollutants emitted. Exclusion of the background values results in construction impacts which will not exceed state and federal air quality standards. The best available emission control techniques will be used. The the PPP construction site impacts are not unusual in comparison to most construction sites, i.e., construction sites that use good dust suppression techniques and low-emitting vehicles typically do not cause violations of air quality standards.

8.1.6 Consistency with Laws, Ordinances, Regulations and Standards

8.1.6.1 Consistency with Federal Requirements

The Bay Area Air Quality Management District (District) has been delegated authority by the USEPA to implement and enforce most federal requirements that are applicable to the PPP, including the new source performance standards and PSD review for all pollutants. Compliance with the District regulations ensures compliance and consistency with the corresponding federal requirements as well. The PPP will also be required to comply with the Federal Acid Rain requirements (Title IV). Since the District has received delegation for implementing Title IV through its Title V permit program, the PPP will secure a

District Title V permit that imposes the necessary requirements for compliance with the Title IV Acid Rain provisions.

8.1.6.2 Consistency with State Requirements

State law sets up local air pollution control districts and air quality management districts with the principal responsibility for regulating emissions from stationary sources. As discussed above, the PPP project is under the local jurisdiction of the BAAQMD, and compliance with District regulations will ensure compliance with state air quality requirements.

8.1.6.3 Consistency with Local Requirements: Bay Area Air Quality Management District

The District has been delegated responsibility for implementing local, state, and federal air quality regulations in the nine counties surrounding the Bay Area. The PPP project is subject to District regulations that apply to new sources of emissions, to the prohibitory regulations that specify emission standards for individual equipment categories, and to the requirements for evaluation of impacts from toxic air pollutants. The following sections include the evaluation of facility compliance with the applicable District requirements.

Under the regulations that govern new sources of emissions, the PPP is required to secure a preconstruction Determination of Compliance from the District (Regulation 2, Rule 3), as well as demonstrate continued compliance with regulatory limits when the PPP becomes operational. The preconstruction review includes demonstrating that the PPP will use best available control technology (BACT) and will provide any necessary emission offsets.

Applicable BACT levels are shown in Table 8.1-32, along with anticipated potential facility emissions. BAAQMD Rule 2-2-301 requires the PPP to apply BACT for emissions of NO_x, POC, SO_x, CO and PM_{10} (criteria pollutants) in excess of 10.0 pounds per highest day. Rule 2.2-301.2 imposes BACT for emissions of lead, asbestos, beryllium, mercury, fluorides, sulfuric acid mist, hydrogen sulfide, total reduced sulfur, and reduced sulfur compounds when emitted in excess of specified amounts. The PPP will not emit any of these latter pollutants in detectable quantities; therefore, Rule 2-2-301.2 is not applicable to the PPP. As shown in the table, BACT is required for NO_x, POC, SO_2, CO, and PM_{10}. The calculation of facility emissions was discussed in AFC Section 8.1.5.1.

BACT for the applicable pollutants was determined by reviewing the District BACT Guidelines Manual, the South Coast Air Quality Management District BACT Guidelines Manual, the most recent Compilation of California BACT Determinations, CAPCOA (2nd Ed., November 1993) and USEPA's BACT/LAER Clearinghouse. A summary of the review is provided in Appendix 8.1F. For the gas turbines and duct burners, the District considers BACT to be the most stringent level of demonstrated emission control that is feasible. The PPP will use the BACT measures discussed below.

As a BACT measure, the PPP will limit the fuels burned to natural gas, a clean burning fuel. Liquid fuels will not be fired at the PPP. Burning of liquid fuels in the gas turbine combustors and duct burners would result in greater criteria pollutant emissions than if the units burned only gaseous fuels. This measure acts to minimize the formation of all criteria air pollutants.

Table 8.1-32. Facility Best Available Control Technology (BACT) requirements.

Pollutant	Applicability Level	Facility Emission Level (lbs/day)[1]	BACT Required
Criteria Pollutants: District Regulation 2-2-301.1			
POC	10 lbs/day	70.4	yes
NPOC	10 lbs/day	-	no
NO_x	10 lbs/day	401.9	yes
SO_2	10 lbs/day	16.4	yes
PM_{10}	10 lbs/day	179.9	yes
CO	10 lbs/day	380.8	yes
Noncriteria Pollutants: District Regulation 2-2-301.2			
Lead	3.2 lbs/day	Neg	no
Asbestos	0.04 lbs/day	Neg	no
Beryllium	0.002 lbs/day	Neg	no
Mercury	0.5 lbs/day	Neg	no
Fluorides	16 lbs/day	Neg	no
Sulfuric acid mist	38 lbs/day	Neg	no
Hydrogen sulfide	55 lbs/day	Neg	no
Total reduced sulfur	55 lbs/day	Neg	no
Reduced sulfur compounds	55 lbs/day	Neg	no

[1]Including cooling tower.

BACT for NO_x emissions will be the use of low NO_x emitting equipment and add-on controls. The PPP has selected a gas turbine equipped with water injection for NO_x control. The gas turbine water injected standard combustors will generate a maximum of 25 ppmvd NO_x, corrected to 15 percent O_2 at loads from 30 % to base load. In addition, the PPP will use a selective catalytic reduction (SCR) system to further reduce NO_x emissions to 2.5 ppmvd NO_x, corrected to 15 percent O_2 (3-hour average). The District BACT guidelines indicate that BACT from large gas turbines (>23 MMBtu/hr heat input) is an exhaust concentration not to exceed 2-3 ppmvd NO_x, corrected to 15 percent O_2; therefore, the PPP will meet the necessary BACT requirements for NO_x. The duct burner will also be exhausted to the SCR system; therefore, BACT for the duct burner is also the stringent 2-3 ppmvd NO_x level, corrected to 15 percent O_2. The District BACT Guideline determination for NO_x from gas turbines is shown in Appendix 8.1F.

BACT for CO emissions will be achieved by use of gas turbines equipped with water injection and the use of duct burners with low CO production characteristics. In addition, the PPP units will be equipped with oxidation caltalysts for further control of CO. Standard combustors equiped with water injection emit acceptable levels of combustion CO while still maintaining low NO_x formation. The PPP has specified a CO limit of 4 ppmvd, corrected to 15 percent O_2, for all load conditions down to approximately 70% of base load, or ~346 MMBtu/hr heat release in each combustion turbine. The duct burner controlled CO emission rate is 0.01 pounds CO per million Btu heat input. The District BACT guidelines indicate that BACT from large gas turbines (>23 MMBtu/hr heat input) is 4 ppmvd CO, corrected to 15 percent O_2. CO emissions from the PPP HRSG stacks will meet the District BACT requirements. The CO emission rate from the gas turbines and duct burners, as measured at the HRSG exhaust stacks, will not exceed 4 ppmvd, corrected to 15 percent O_2 during base load and duct firing operations. CO emissions will be higher during turbine startups. A review of recent BACT determinations for CO from gas turbines is provided in Appendix 8.1F.

BACT for POC emissions will be achieved by use of water injection and the use of duct burners with similarly low POC production characteristics. The duct burner POC emission rate is 0.003 lbs/MMBtu heat input. BACT for POC emissions from combustion devices has historically been the use of best combustion practices. In addition, POC emissions are expected to be further reduced as a result of the proposed CO oxidation catalyst. The amount of reduction is not estimated herein, but recent data indicates that POC reductions on the order of 25-50% are routinely seen. With the use of the water injection, CO catalyst, and advanced duct burner design, POC emissions leaving the HRSG stacks will not exceed 2.0 ppmvd, corrected to 15 percent oxygen. This level of emissions meets the BAAQMD BACT requirements.

BACT for PM_{10} and SO_2 is best combustion practices and the use of gaseous fuels. As mentioned above, use of clean burning natural gas fuel will result in minimal particulate and sulfur dioxide emissions.

Emissions Offsetting

In addition to the BACT requirements, District regulation 2-2-215, 302 and 303 requires the PPP to provide full emission offsets (emissions reduction credits, or ERCs) when emissions exceed specified levels on a pollutant-specific basis. Additionally, regulations 2-2-215, and 302 requires offsets to be calculated based upon the cumulative increases at existing facilities which occurred pursuant to the issuance of ATC's or PTO's after April 5, 1991 which are under the same ownership or entitlement to use that are located within a distance of three (3) miles, property line to property line, and which have common SIC codes (first two digits). In these situations, the existing facility or facilities and the proposed new facility are considered as one source. Presently, the City of Santa Clara/Silicon Valley Power (SVP) owns and operates two (2) power production sites within 3 miles of the proposed project. These sites are identified as follows:

- Site 1 - Cogeneration Plant #1 (AQMD Plant ID #621), 560 Robert Ave., Santa Clara, CA.
- Site 2 - Gianera Peaker Plant (AQMD Plant ID #1771), Gianera Street, Santa Clara, CA.

Based on data supplied by the City of Santa Clara, neither of the existing facilities have had any ATC's or PTO's issued after April 5, 1991 which have resulted in an emissions increase of any pollutant. As a result, only the proposed emissions from the PPP project are subject to the AQMD offset provisions in Regualtion 2, Rule 2. Table 8.1-33 shows the cumulative emissions increase for the proposed facility and the offsets required per regulation 2-2-215.

Table 8.1-34 shows the offset requirements based solely on the PPP project emissions increases.

Section 2-2-302 requires POC and NO_x emission reduction credits to be provided at an offset ratio of 1:1 or 1.15:1 dependent upon emissions levels. Because both POC and NO_x contribute to the Bay Area Basin ozone levels, Section 2-2-302.2 allows emission reduction credits of POC's to be used to offset increased emissions of NO_x, at the required offset ratios as stated above.

Section 2-2-303 requires emissions offsets for emissions increases at facilities that emit more than 100 tpy of SO_2 and PM_{10}. As facility emissions of SO_2 and PM_{10} will be below 100 tpy, SO_2 and PM_{10} offsets are not required.

Table 8.1-33. Cumulative emissions increases and required offsets per Regulation 2-2-215.

Pollutant	Cumulative Offset Threshold	Offset Ratio	Cumulative Increase Since April 5, 1991	PPP Emission Rates	Cumulative Emisisons Increase	Offsets Required
POC	15/50 tpy	>15 but < 50 1:1 > 50 1.15:1	0	11.5 tpy	11.5 tpy	No
NO_x	15/50 tpy	>15 but < 50 1:1 > 50 1.15:1	0	51.5 tpy	51.5 tpy	Yes
PM_{10}	100 tpy	If major and increase is > 1 tpy, then 1:1	0	30.4 tpy	30.4 tpy	No
CO	100 tpy	> 100 tpy increase Modeling plus offsets to show attainment and maintenance of standard	0	49.5 tpy	49.5 tpy	No
SO_2	100 tpy	If major and increase is > 1 tpy, then 1:1	0	2.93 tpy	2.93 tpy	No

Table 8.1-34. Offset Requirements for the PPP per Regulation 2-2-302.

Pollutant	New Facility Offset Threshold	PPP Emission Rates	Offsets Required	Offset Ratio	Amount of Offsets Required
POC	15/50 tpy	11.5 tpy	No	1:1/1.15:1	0
NO_x	15/50 tpy	51.5 tpy	Yes	1:1/1.15:1	59.23 tpy
PM_{10}	100 tpy	30.4 tpy	No	1:1	0
CO	100 tpy	49.5 tpy	No	1:1	0
SO_2	100 tpy	2.93 tpy	No	1:1	0

Sections 2-2-304 and 2-2-305 impose emissions offset requirements, or require project denial, if SO_2, NO_2, PM_{10}, or CO air quality modeling results indicate emissions will interfere with the attainment or maintenance of the applicable ambient air quality standards or will exceed PSD increments. For many of the pollutants and averaging periods, District regulations do not require the PPP to conduct these analyses, since the modeled impacts of the proposed facility are not significant under District rules. However, modeling for these pollutants has been conducted to satisfy CEC requirements. The modeling analyses show that facility emissions will not interfere with the attainment or maintenance of the applicable air quality standards.

Emissions offset requirements for NO_x and POC are shown in Table 8.1-35 below. The project Applicant will provide all necessary documentation to show control or ownership of the required emissions offsets prior to issuance of the facility Permit to Operate by the BAAQMD per AQMD regulation 2-2-410. Offsets may be acquired from the District bank or from other sources such as shutdowns, or non-traditional sources of emissions reductions credits.

Emissions offset requirements for CO per regulation 2-2-305 are implied at a 1:1 ratio for sources with emissions above the stated major source thresholds which cannot show compliance, through modeling, with the CO ambient air quality standards.

Table 8.1-35. Facility offset requirements.

Pollutant	Emissions (tons/yr)	Required Offset Ratio	Required Offsets (tons/yr)
NO_x	51.5	1.15:1	59.23
POC	11.5	-	0
PM_{10}	30.4	-	0
CO	49.5	-	0
SO_2	2.9	-	0

A current listing of deposits in the BAAQMD offset bank is included in Appendix 8.1G. Should the project applicant decide to acquire offsets from the District bank, negotiations on amounts and market prices will be undertaken with various certificate owners. Because of the highly competitive nature of the offset market, confidential treatment of negotiations with the various owners is requested. Such information will be supplied to the CEC and BAAQMD under separate cover.

As discussed in AFC Section 5.1.2, Regulatory Setting, the BAAQMD PSD program requirements apply on a pollutant-specific basis to:

- A new major facility that will emit 100 tpy or more, if it is one of the PSD source categories in the federal Clean Air Act, or a new facility that will emit 250 tpy or more; or
- A facility that emits 100 tpy or more, with net emissions increases since the applicable PSD baseline date that exceed the modeling threshold levels shown in Table 8.1-36.

Table 8.1-36. BAAQMD PSD requirements applicable to 100 tpy fossil fuel fired power plants.

Pollutant	PSD Facility Applicability Level	Modeling Threshold Level	Facility Emissions	Modeling Required	Applicable District Regulation
NO_x	100 tpy	100 tpy	51.5	no	2-2-304.2
SO_2	100 tpy	100 tpy	2.93	no	2-2-304.2
PM_{10}[1]	100 tpy	100 tpy	30.4	no	2-2-304.3
CO	100 tpy	100 tpy	49.5	no	2-2-305.1
POC	100 tpy	not required	11.5	-	-

[1]All particulate matter from the PPP is assumed to be emitted as PM_{10}. Includes cooling tower.

The PPP is a new non-major source as defined by BAAQMD regulations. Therefore, it is not subject to the USEPA and District PSD regulations. The District modeling threshold requirements and their applicability to the PPP are shown in Table 8.1-36. Notwithstanding the above, the required modeling analysis was carried out and the results presented in Section 8.1.5.1.2.

As discussed below, the specific District Regulation 2, Rule 2 criteria for conducting modeling analyses have been met.

Rule 2-2-414.1 requires that the modeling be conducted with appropriate meteorological and topographic data necessary to estimate impacts. The PPP modeling analyses used District-approved U.S. Geological Service topographic data for the surrounding area and District-approved weather data gathered from the

San Jose Airport meteorological monitoring station approximately 1.0 mile southeast from the project site. As discussed above, the meteorological data meet the requirements of USEPA guidance.

Rule 2-2-304 and 2-2-412.2 require a demonstration that emission increases subject to the PSD program not interfere with the attainment or maintenance of any State or national ambient air quality standards for each applicable pollutant, unless adequate emissions offsets are provided. As shown in Table 8.1-28, the PPP will not exceed any BAAQMD PSD significance levels. In addition, offsets will be provided for increases in NO_x emissions. Therefore, project impacts on state and federal ambient air quality standards are not considered significant. Additionally, the modeling analysis results do not show an exceedance of State or national ambient air quality standards, with the exception of the state 24-hour average PM_{10} standard, which is already being exceeded. The modeling analysis is discussed in detail in Section 8.1.5.1.2.

For an application that triggers PSD modeling requirements, Rules 2-2-211 and 2-2-413.3 require that ambient monitoring data be gathered for one year preceding the submittal of a complete application, or a District-approved representative time period. However, if the air quality impacts of the PPP do not exceed the specified *de minimis* levels on a pollutant-specific basis, the PPP is exempted from the preconstruction monitoring requirement. The air quality impacts of the PPP's NO_x, CO, SO_2 and PM_{10} emissions were below their respective *de minimis* levels, as shown in Table 8.1-21, and therefore the exemption applies to the proposed project. The District-operated ambient monitoring stations in San Jose, Mountain View, and San Francisco are representative of existing air quality in the vicinity of the project, and were used to determine existing ambient concentrations.

Rule 2-2-308 requires applicants to demonstrate that emissions from a project located within 10 km (6.2 miles) of a Class I area will not cause or contribute to the exceedance of any national ambient air quality standard or any applicable Class I PSD increment. Because the nearest Class I areas, Point Reyes National Seashore and Pinnacles National Park, are over 80 km from the PPP, this section is not applicable to the proposed facility. Notwithstanding the above, the PPP has provided modeling impact data for the Class I areas in Appendix 8.1B.

Rule 2-2-417 requires an applicant for a permit subject to a PSD air quality analysis to provide additional analysis of the impact of the facility on visibility, soils and vegetation. The visibility analysis is provided in Section 8.1.5.3. The soils and vegetation analyses are provided in 8.2 and 8.4 of the AFC.

Rule 2-2-306 is also not applicable to the PPP. This section requires modeling analyses for specific noncriteria pollutants (lead, asbestos, beryllium, mercury, fluorides, sulfuric acid mist, hydrogen sulfide, total reduced sulfur and reduced sulfur compounds) if they are emitted in significant quantities and if the facility emits more than 100 tons per year of any criteria pollutant. As the PPP will not emit significant quantities of the specific noncriteria pollutants, a noncriteria pollutant modeling analysis under this section is not required. However, a screening health risk assessment has been conducted for potential emissions of toxic air contaminants. The analysis methodology and results are discussed in Section 8.1.5.2.

Rule 2-2-418 requires the use of Good Engineering Practices (GEP) stack height. Conformance with the GEP stack height requirement was demonstrated in the modeling analysis conducted for the PPP.

Regulation 2, Rule 6, Major Facility Review (Title V permit program), applies to facilities that emit greater than 100 tons per year on a pollutant-specific basis. Although the PPP will not emit pollutants above the Title V applicability thresholds, under the Title V permit program the PPP will be required to file an application for a Title V operating permit within 12 months of facility startup based on the fact its it is an affected facility under Title IV and is subject to a NSPS. The Phase II acid rain requirements will also apply to the PPP. As a Phase II Acid Rain facility, the PPP will be required to provide sufficient allowances for every ton of SO_2 emitted during a calendar year. The PPP will obtain any necessary allowances on the current open trade market. The PPP will also be required to install and operate continuous monitoring systems; District enforcement of its rules will ensure installation of these systems.

The general prohibitory rules of the District are applicable to the PPP. Each of these rules is discussed below and a determination of compliance is presented.

Regulation 1-301 addresses Public Nuisance. The PPP will emit insignificant quantities of odorous or visible substances; therefore, the PPP will comply with this regulation.

Regulation 6 pertains to particulate matter and visible emissions. Any visible emissions from the project will not be darker than No. 1 when compared to a Ringlemann Chart for any period(s) aggregating 3 minutes in any hour. Because the PPP will burn clean fuels, the opacity standard of not greater than 20 percent for a period or periods aggregating 3 minutes in any hour and the particulate emission concentrations limit of 0.15 grains per standard cubic feet of exhaust gas volume will not be exceeded.

Regulation 7, Odorous Substances, is not applicable to the PPP. Gas turbine operations do not result in odor complaints.

Regulation 9, Rule 1, Sulfur Dioxide, specifies an emission standard of less than 300 ppm SO_2. Because of the insignificant quantities of sulfur in natural gas, this limit will be achieved. In addition, the ambient air quality modeling analysis discussed in Section 8.1.5.1.2 shows that ground-level concentrations of SO_2 from the PPP will not result in ground-level concentrations in excess of 0.5 ppm continuously for 3 consecutive minutes or 0.25 ppm averaged over 60 consecutive minutes, or 0.05 ppm averaged over 24 hours.

Regulation 9, Rule 2, pertains to hydrogen sulfide. The PPP is not expected to emit H_2S.

Regulation 9, Rule 3, Nitrogen Oxides From Heat Transfer Operations, imposes a NO_x limit of 125 ppm. The PPP will easily comply with this rule.

Regulation 9, Rule 9, limits the emissions of nitrogen oxides from gas turbines during baseload operations to less than 9 ppmv corrected to 15 percent O_2. The PPP's NO_x level of 2.5 ppmvd, corrected to 15 percent O_2, will satisfy the requirements of this rule. In addition, the continuous emission monitoring (CEM) system that the PPP will install will also satisfy the monitoring and recordkeeping requirements of this rule.

Regulation 9, Rule 10, limits hexavalent chromium emissions from cooling towers. Chemicals containing hexavalent chromium will not be used in the PPP cooling tower; therefore, rule requirements will be met.

District Regulation 10 (40 CFR 60 subpart GG) adopts by reference the federal New Source Performance Standard (NSPS) for stationary gas turbines. This regulation requires monitoring of fuel; imposes limits on the emissions of NO_x and SO_2; and requires source testing of stack emissions, process monitoring, and data collection and recordkeeping. All of the BACT limits imposed on the PPP will be more stringent than the requirements of the NSPS emission limits. Monitoring and recordkeeping requirements for BACT will be more stringent than the requirements in this rule. The PPP will comply with the NSPS regulation.

A summary of the demonstration of compliance with applicable LORS is provided in Table 8.1-37.

A complete application for an "Authority to Construct" will be filed with the BAAQMD within 1 week (5 working days) of the PPP AFC filing.

8.1.7 Cumulative Air Quality Impacts Analysis

An analysis of potential cumulative air quality impacts that may result from the PPP and other reasonably foreseeable projects is generally required only when project impacts are significant.

To ensure that potential cumulative impacts of the PPP and other nearby projects are adequately considered, a cumulative impacts analysis was conducted in accordance with the protocol included as Appendix 8.1H. This procedure is similar to that used to evaluate increment consumption, although no increment consumption analysis is required for the PPP project.

8.1.8 Mitigation

While the BAAQMD regulations require facility emissions offsets to be provided on an annual average basis, the CEC may mandate additonal mitigation in addition to that required by the AQMD. Maximum worst-case hourly, daily, and annual emissions are based on expected operation of the PPP, including the cooling tower, as presented in Appendix 8.1A, Table 8.1A-6.

Mitigation for annual emissions will be provided through the acquisition of offsets as delineated in Table 8.1-34. As discussed in Section 8.1.5.3, sufficient offsets to fulfill this requirement will be provided by the applicant prior to issuance of the BAAQMD Permit to Operate per regulation 2-2-410. The applicant will provide offsets according to the ratios specified in the BAAQMD NSR regualtion.

8.1.9 References

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Table 8.1-37 Laws, ordinances, regulations, standards (LORS), and permits for protection of air quality.

LORS	Purpose	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Section)
Federal					
Clean Air Act (CAA) §160-169A and implementing regulations, Title 42 United States Code (USC) §7470-7491 (42 USC 7470-7491), Title 40 Code of Federal Regulations (CFR) Parts 51 & 52 (40 CFR 51 & 52). (Prevention of Significant Deterioration Program)	Requires prevention of significant deterioration (PSD) review and facility permitting for construction of new or modified major stationary sources of air pollution. PSD review applies to pollutants for which ambient concentrations are lower than NAAQS.	BAAQMD with USEPA oversight	After project review, issues Authority to Construct (ATC) with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.1, 8.1.4.2, Tables 8.1-10,11,26,27,28 Appendix 8.1C and F
CAA §171-193, 42 USC §7501 et seq. (New Source Review)	Requires new source review (NSR) facility permitting for construction or modification of specified stationary sources. NSR applies to pollutants for which ambient concentration levels are higher than NAAQS.	BAAQMD with USEPA oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.1, Tables 8.1-10,11,26,27,28, Appendix 8.1C and F
CAA §401 (Title IV), 42 USC §7651 (Acid Rain Program)	Requires reductions in NO_x and SO_2 emissions.	BAAQMD with USEPA oversight	Issues Acid Rain permit after review of application.	Application to be made within 12 months of start of facility operation.	8.1.4.1
CAA §501 (Title V), 42 USC §7661 (Federal Operating Permits Program)	Establishes comprehensive permit program for major stationary sources.	BAAQMD with USEPA oversight	Issues Title V permit after review of application.	Application to be made within 12 months of start of facility operation.	8.1.4.1
CAA §111, 42 USC §7411, 40 CFR Part 60 (New Source Performance Standards - NSPS)	Establishes national standards of performance for new stationary sources.	BAAQMD with USEPA oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.1, 8.1.4.2
CAA §112, 42 USC §7412, 40 CFR Part 63 (National Emission Standards for Hazardous Air Pollutants - NESHAPs)	Establishes national emission standards for hazardous air pollutants.	BAAQMD with USEPA oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.1, 8.1.4.2
State					
California Health & Safety Code (H&SC) §41700 (Nuisance Regulation)	Outlaws discharge of such quantities of air contaminants that cause injury, detriment, nuisance, or annoyance.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.1

Table 8.1-37 (continued).

LORS	Purpose	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Section)
H&SC §44300-44384; California Code of Regulations (CCR) §93300-93347 (Toxic "Hot Spots" Act)	Requires preparation and biennial updating of facility emission inventory of hazardous substances; risk assessments.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Screening HRA submitted before start of construction.	8.1.4.1., 8.1.5.2
California Public Resources Code §25523(a); 20 CCR §1752, 2300-2309 (CEC & CARB Memorandum of Understanding)	Requires that CEC's decision on AFC include requirements to assure protection of environmental quality; AFC required to address air quality protection.	CEC	After project review, issues Final Determination of Compliance (FDOC) with conditions limiting emissions.	CEC approval of AFC, i.e., FDOC, to be obtained before start of construction.	8.1.4.1, Appendix 8.1A thru I
Local					
BAAQMD Regulation 1 §301(Public Nuisance)	Prohibits emissions in quantities that adversely affect public health, other businesses, or property.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.2
BAAQMD Regulation 2 (Permits), Rule 2 (New Source Review)	NSR and PSD: Requires that preconstruction review be conducted for all proposed new or modified sources of air pollution, including BACT, emissions offsets, and air quality impact analysis.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.1, 8.1.4.2, Tables 8.1-10,11,26,27,28, Appendices 8.1A thru I
BAAQMD Regulation 2, Rule 6 (Major Facility Review)	Implements operating permits requirements of CAA Title V and acid rain regulations of CAA Title IV.	BAAQMD	Issues Title V permit after review of application.	Application to be made within 12 months of start of facility operation.	8.1.4.1, 8.1.4.2
BAAQMD Regulation 6 (Particulate Matter and Visible Emissions)	Limits visible emissions to no darker than Ringelmann No. 1 for periods greater than 3 minutes in any hour; limits PM emissions to #0.15 gr/dscf.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.2
BAAQMD Regulation 7 (Odorous Substances)	Limits emissions of dimethylsulfide, ammonia, mercaptan, phenols, and trimethylamine; becomes applicable upon confirmation of 10 or more odor complaints with 90 days.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.2
BAAQMD Regulation 9, Rule 1 (Sulfur Dioxide)	Limits SO_2 emissions to <300 ppm; also limits SO_2 emissions resulting in ground level concentrations of specified level and duration.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.2

Table 8.1-37 (continued).

LORS	Purpose	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Section)
BAAQMD Regulation 9, Rule 2 (Hydrogen Sulfide)	Limits H_2S emissions during any 24-hour period that result in ground level H_2S concentrations exceeding specified levels and durations.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.2
BAAQMD Regulation 9, Rule 3 (Heat Transfer Operation NO_x Emissions Limits)	Limits NO_x emissions from new heat transfer operations $250 MMBtu/hr maximum to <125 ppm.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.2
BAAQMD Regulation 9, Rule 9 (Nitrogen Oxides from Stationary Gas Turbines)	Limits NO_x emissions during baseload operations to 9 ppmv @ 15 percent exhaust oxygen (15 ppmv if SCR is not used).	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.2
BAAQMD Regulation 10 (40 CFR 60 Subpart GG) (Standards of Performance for Stationary Gas Turbines)	Requires monitoring of fuel, other operating parameters; limits NO_x and SO_2 emissions, requires source testing, emissions monitoring, and the PPPordkeeping.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.2
BAAQMD Regulation 11, (Hazardous Pollutants)	Implements federal NESHAP regulations.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.2